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A RECLASSIFICATION AND PHYLOGENY OF THE TERMATOPHYLINI (HETEROPTERA: MIRIDAE: DERAEOCORINAE), WITH A TAXONOMIC REVISION OF THE AUSTRALIAN SPECIES, AND A REVIEW OF THE TRIBAL CLASSIFICATION OF THE DERAEOCORINAE

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Abstract.—The genera of Termatophylini are described, including two new genera, ***Democoris*** and ***Kundakimuka,*** from Australia. A key is given to the termatophyline genera. The type species of all the genera are described, and six new species of Australian termatophylines, ***Kundakimuka carvalhoi***, ***K. queenslandica***, ***Democoris lugens***, ***D. leptocytus***, ***Termatophylum melaleucae*** and ***T. weiri***, are described. A key is given to the Australian termatophyline species. The tribe is re-defined on the basis of the short first labial segment, the presence of antero-lateral pronotal setae, and the exposed metathoracic spiracle. The genera *Conocephalocoris, Hesperophylum* and *Termatomiris* are removed from the Termatophylini and placed in the Deraeocorini. A cladistic analysis of the Termatophylini is provided on the basis of 29 morphological characters. The sister-group relationships are discussed and the characters are reviewed. Characters of the pterothoracic pleura, particularly the metathoracic spiracle and the scent efferent system of the metathoracic glands are extensively utilized in this study. These characters are also discussed for other suprageneric groups of Miridae. The tribal classification of the Deraeocorinae is reviewed, and it is concluded that none of the other tribes are adequately defined. It is also firmly established that the termatophylines are mirids, and that any similarity with the Anthocoridae is due to convergence.

Key Words: Heteroptera, Miridae, Deraeocorinae, Termatophylini, revision, phylogeny, new genera, new species, Australia

The Termatophylini have had a labile position within the classification of the Cimicomorpha, varying from family status (Reuter 1910, Wagner 1970), as a subfamily within the Anthocoridae (Reuter 1884a, b) and Miridae (China and Myers 1929), and more recently as a tribe of the mirid subfamily Deraeocorinae (Carvalho 1952, 1955a, 1957). Mention has been made of their salient similarity with some members of the Anthocoridae (Schuh 1976). Curiously, after Carvalho (1952) placed them in the Deraeocorinae, there has been little dispute as to their monophyly nor their familial or subfamilial position. This view is supported in this work despite the present conclusion that the previous tribal definition, based primarily on a porrect head, neither holds for the tribe, nor is exclusive for other Deraeocorinae.

This work was initiated by the receipt of a box of mirid specimens from the Museum and Art Galleries of Northern Territories, amongst which, one specimen of a termatophyline from Smith Point, near Darwin, brought forth the question, "why is this mirid so like an anthocorid?" This exaggerated specimen has gigantic hind femora, somewhat like those found in members of the Halticini (Miridae: Orthotylinae). Aside from this apomorphy, the similarity of its overall facies with anthocorids is striking, and the absence of ocelli and presence of a hemelytral membrane cell, suggested an alternative taxonomic arrangement. Characters of the male genitalia and the presence of femoral trichobothria strongly support the placement of the termatophylines within the Miridae. The anthocorid-like features, however, provided the impetus for making an analysis of the termatophylines, mindful of present definitions of the Miridae, Anthocoridae and other cimicomorphan families (Schuh and Stys 1991).

In this work I also support the placement of the termatophylines in the Deraeocorinae, but in redefining them as a monophyletic tribe, I have discovered that the other deraeocorine tribes are presently inadequately defined. I have given a commentary on the characters presently used in these classifications and suggest alternative characters, particularly of the pterothoracic pleura. In particular I have introduced a morphological comparison of the metathoracic spiracular opening and the scent efferent system of the metathoracic glands in the Miridae, to reappraise previous characters, such as the basally cleft claws, primarily used to place the termatophylines within the Deraeocorinae.

An invitation to provide a contribution to a Festschrift for Dr. José Carvalho, rendered this idea into its present form. The Termatophylini have not been previously recorded from Australia. In accumulating all the Australian termatophyline material it was clear that not all termatophylines were anthocorid-like, which led me to study the Australian fauna, redescribe the genera worldwide, including a checklist of species, phylogenetic definition and position of the termatophylines, and a cladistic analysis of the genera. Jose Carvalho's contributions on the Miridae, including the Australian fauna, remains unparalleled. Cassis and Gross (in press) report that Carvalho described more than half of the Australian mirid fauna. He had also commenced numerous projects on the Australian Miridae, and much of the termatophyline material in this work has passed through his hands, including *Democoris lugens* n. gen. and n. sp. I have provided a dedication to him by naming the unique Smith Point species in his honour, under the new generic name, *Kundakimuka*.

In this work I have recognized eight genera and 30 species of Termatophylini. The genus *Democoris* is restricted to south temperate Australia. The genera *Kundakimuka* and *Termatophylum* Reuter are broadly distributed in the Eastern Hemisphere, including Australia. *Termatophylella* Carvalho, *Termatophylidea* Reuter and Poppius, *Termatophyloides* Carvalho are restricted to the Western Hemisphere. *Termatophylina* Carvalho is restricted to the Oriental region. *Arygrotelaenus* Reuter and Poppius is restricted to the Middle East. I have provided a key to the world genera, which is based entirely on external characters, and a key to all known Australian species. In redefining the Termatophylini I have transferred *Conocephalocoris* Knight, *Hesperophylum* Reuter and Poppius and *Termatomiris* Ghauri to the Deraeocorini.

MATERIALS AND METHODS

About 110 specimens of termatophylines were examined in this study. This material was borrowed from the Natural History Museum, London and the National Museum of Natural History, Smithsonian Institute, Washington, and the major collections found within Australia. The specimens of the type specimens were examined. No males of *Arygrotelaenus elegans* Reuter and Poppius were available for examination. The generic definitions incorporate observations of most termatophyline species. Not all species of *Termatophylum* and *Termatophylidea* were examined, but the descriptions in the literature were sufficient to confidently retain within them all previously assigned species.

The male genitalic characters were examined on temporary mounts in glycerin, using both a Zeiss SR Stereomicroscope and a Leitz Laborlux S Compound microscope. The line drawings were prepared using a camera lucida. Scanning electron micrographs were made from dried museum specimens, using a Cambridge S120 microscope.

Taxonomic Characters

The morphological terminology used in this work is derived from various sources. Many of the terms used for somatic characters are now conventional, following the modern works of authors such as Schuh (e.g. 1984). Some original interpretation was involved in my treatment of the forewing, the pterothoracic pleura and the male genitalia.

In this work I introduce the use of comparative morphology of the pterothoracic pleura, particularly the condition of the metathoracic spiracle and the scent efferent system of the metathoracic scent glands. The homologies are partly derived from Carayon (1971) and Staddon (1979) for the Heteroptera, and Larsen (1945) and Southwood (1953) for the Miridae. The junction of the mesepimeron and metepisternum contains in some Miridae, a visible opening of the metathoracic spiracle (Figs. 57, 65). Its position and associated structures are both phylogenetically and taxonomically significant (Cassis 1984, Cassis in preparation). The external cuticular component of the metathoracic scent glands yields a wealth of systematic characters. The terminology of this system remains greatly confused, and requires standardization across the Heteroptera. Staddon (1979) has referred to this system as the scent efferent system, which I have adopted in this work. His nomenclature of the scent efferent system components has not proven as useful, and I have preferred to use a translation of some of the terminology of Carayon (1971). I refer to the gutterlike channel which emerges from the ostiole as the peritreme. This structure is usually tonguelike and extends to the lateral margins of the metepisternum. Under light microscopy it often appears shiny, whereas under scanning electron microscopy it is usually covered with microsetae. The peritreme is surrounded by highly dissected cuticle, which has a granulate appearance and is referred to as the evaporative areas. The evaporative areas are composed of numerous components, and in this work I refer chiefly to the evaporative caps, which are raised and flattened. The characters of the scent efferent system are labeled in Figs. 57, 119 and 123. I have included in the *Phylogenetic* analysis section below an evaluation of these characters in other Miridae.

The forewing venation of the termatophylines has been used extensively in this work, both as diagnostic and phylogenetic characters. The terminology and homology of the heteropteran forewing has been partly resolved by Tanaka (1926), Wootton and Betts (1986), and Betts (1986). Carver et al. (1991) refer to the posterior margin of the embolium in the Miridae as the R+M vein, whereas Knight (1941) considered this to be the costal vein. I accept the former interpretation and concur with Betts (1986) that the vein anteriad to the R+M vein is the subcostal vein, which is evident in some Miridae. In this work I refer to the groove posteriad to R+M vein as the median flexion line. Knight (1941) referred to this groove as the radial vein, but its appearance suggests a flexion line, rather than a tracheate vein. Its position, posteriad to the posterior margin of the embolium, eliminates its interpretation as a radial (or R+M) vein. The median flexion line cannot be interpreted as the CuA vein, which according to Betts (1986), is an uninterrupted vein, parallel and adjacent to the claval furrow. The vein of the clavus is referred to as the first anal vein by Betts (1986), which I have adopted in this work, and is synonymous with the claval vein of Knight (1941). Other workers, such as Davis (1961), have produced venational terminologies for the Heteroptera, but it is beyond the scope of this paper to contrast in detail the various systems. The characters of the forewing are labeled in Fig. 47.

The morphology of the male genitalia of the Deraeocorinae has received little attention. Kelton (1959) gave a comparative morphological account, and reported considerable diversity in form throughout the subfamily. He stated that the most distinctive features included the flexible ductus seminis, and the bulbous spiculate processes of the membranous vesica. Schwartz (1987) in a review of Mirinae and Deraeocorinae male genitalia suggested that the secondary gonopore was of critical importance, and that it differed in the two subfamilies. He reported that the secondary gonopore of the Deraeocorini terminated adjacent and usually basad of the membrane, and that the aperture is large and opens into a depressed trough, often with associated serrate sclerotized plates. He also stated that the secondary gonopores in the other Deraeocorinae tribes were smaller than those found in the Deraeocorini. Schwartz (1987) reviewed the terminology of the vesical processes used in previous works (Kelton 1959, Clayton 1982, Stonedahl 1983), suggesting that they were too simplified. Stonedahl (1988) differentiated two types of vesical processes in the mirine genus *Phytocoris* Fallén, as follows: (1) sclerotized processes (equivalent to the ribbonlike strap of Schwartz (1987)) which originate at or near the level of the gonopore, which is sometimes continuous or associated with the basal sclerite (originating basad to the secondary gonopore and not present in the Deraeocorinae examined), and variously attached to the membranous sac; (2) lobal sclerites (Schwartz 1987) which originate at or distally on the membranous lobes, and as simple outgrowths of the membrane cuticle (equivalent to spicules or spiculae of other authors).

Stonedahl and Cassis (1991) in a revision of the deraeocorine genus *Fingulus* Distant described the male genitalia, and reported homologies and terminologies that have apparent general value in the Deraeocorinae, including the Termatophylini. They described the male genitalia of *Fingulus* as possessing a basal tubular, sclerotized skirt surrounding the distal region of the ductus seminis, a simple secondary gonopore, and a distal multilobed membranous sac with lobal sclerites and/or fields of spines. They found no evidence of sclerotized processes or basal processes.

In the Termatophylini the ductus seminis terminates at the base of the membranous component of the vesica (Figs. 111–118), as reported for the Deraeocorini by Schwartz (1987). The secondary gonopore is small, simple and undifferentiated, as is found in *Fingulus.* Aside from the genus *Termatophylidea,* the gonopore is associated with a differentiated basal portion of the membranous sac, which can be recognized as a V or U-shaped cavity marked by compact fields of spines (Figs. 111–113, 115–118), and is here referred to as the gonoporal cavity. It is difficult to ascertain in the Termatophylini whether the sclerites which are associated with the gonoporal cavity are lobal sclerites (Figs. 111–113, 115–118), or represent a unique type of vesical process. They are clearly outgrowths of the membranous cuticle, but are never found on the periphery of the membranous lobe. This could not be clarified because of the limited material available for examination. In the Termatophylini, the vesica is small and appears to be unilobed, and does not show any obvious inflation as is evident in other Deraeocorinae and Mirinae. I have tentatively referred to these processes as lobal sclerites pending further study. The distal regions of the membranous sac often have fields of spines (Figs. 111, 116–118).

The vesica of *Termatophylidea* is unlike any other termatophyline, in possessing a sclerotized process connected to the base of the ductus seminis and extending to near the apex of the membranous lobe. It also lacks any obvious gonoporal cavity and there are no lobal sclerites or fields of spines. This is reminiscent of the condition found in the dicyphine genus *Singhalesia* China and Carvalho and in some species of *Hyaliodes* Reuter. The latter genus and *Termatophylidea* are superficially similar, but are clearly differentiated on characters of the head and the pterothoracic spiracle, and the presence of a sclerotized process in both genera is considered to be independently derived. Stonedahl (personal communication) has indicated that the sclerotized process is also present in the clivinemines, *Ambracius* Stål and *Bothynotus* Fieber.

Phylogenetic Methods

The phylogenetic relationships of the termatophyline genera were examined using cladistic methods (Wiley 1981). The cladogram was produced, using in tandem, the computer software HENNIG86 and CLADOS. These programs are designed for producing cladograms of minimal length, and the manipulation of the character data. The character data matrix was built in a text editor and transferred to HENNIG86, where tree building algorithms were applied to the input file. The final result was produced by using the Branch and Bound option, where the data were treated in a stepwise manner. Choice between multiple trees of equal length was made by reweighting characters according to the rescaled consistency index.

The characters were coded as either binary or multistate characters. Most of the multistate characters were ordered, except for characters 4, 23 and 27 (see Table 2), which were coded as non-additive, because there was no evidence of transformation series. Character state polarization was achieved through outgroup comparison. The selection of outgroups was made difficult by current deficiencies in the tribal classification of the Deraeocorinae (Akingbohungbe 1974, 1978, Stonedahl and Cassis 1991). At present six tribes are recognized; Clivinemini, Deraeocorini, Saturniomirini, Hyaliodini, Surinamellini and Termatophylini. A selection of genera from each of the tribes, aside from the ant-mimetic Surinamellini, were initially included in the analysis, to examine the distribution of characters throughout the Deraeocorinae. This produced cladograms with low consistency indices, and the outgroups were then restricted to two members of the Clivinemini (*Ambracius* and *Bothynotus*), and the genera *Conocephalocoris* and *Hesperophylum*, which previously had been included in the Termatophylini. The last two genera show many similarities with the Termatophylini, as presently defined, particularly in the head and hemelytral structure, and are considered as sister-groups. The Clivinemini genera were also included in adherence to multiple outgroup principles (Maddison et al. 1984), and were selected above other deraeocorines because of some structural similarities with termatophylines, particularly in the form of the callosite region of the pronotum. Genera of the Hyaliodini (*Annona* Distant and *Hyaliodes* Reuter), initially included in the analysis, are similar to some *Termatophylini*, particularly the genus *Termatophylidea*, but were excluded because they provided no additional clarification to any of the character state trees. The male genitalic characters were not examined in any of the outgroups because of a lack of specimens. Stonedahl (personal communication) provided information on the male genitalia of some of the outgroup taxa.

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HISTORICAL REVIEW

The first termatophyline, *Termatophylum insigne,* was described by Reuter (1884a), who recognized this species as unique, and erected a new subfamily, the Termatophylina, of Anthocoridae for it. He diagnosed the group on the basis of the four-segmented labium, including the short first segment, the absence of ocelli, hemelytral structure, lack of a hamus in the hindwing, and the three-segmented tarsi. He distinguished it from another anthocorid subfamily, the Microphysina, on hemelytral and tarsal characters. Reuter (1884b) in his monograph of the anthocorids, recognized three subfamilies, Anthocorina, Microphysina and Termatophylina, and provided a key to the subfamilies, differentiating the two latter subfamilies from the Anthocorina by the four-segmented labium. Subsequently, Reuter (1910) in his review of the systematics of the Miridae, recognized the termatophylines as a family, separating them from the mirids by the presence of an embolium. Poppius (1910) supported the family status, in describing a new *Termatophylum* species from the Ethiopian Region.

Reuter and Poppius (1912) in the only previous comprehensive paper on the termatophylines retained the suprageneric group as a family, giving a detailed description, and distinguishing them from the Anthocoridae. They made mention of the porrect head and the short first labial segment, but erroneously concluded that the pretarsi lacked arolia (= parempodia). Schuh (1976) in a review of the mirid pretarsus has shown that setiform and fleshy parempodia are homologous. Early European workers, such as Reuter and Poppius (1912), regarded fleshy parempodia as the only true "arolia," and their conclusion that termatophylines lack "arolia" is a misinterpretation of setiform parempodia. Reuter and Poppius (1912) described three new genera, *Arygrotelaenus, Hesperophylum* and *Termatophylidea,* and seven new species. They also included a key to the four known termatophyline genera. Parshley (1923) described the family, largely repeating Reuter and Poppius' (1912) diagnosis, but curiously suggested that termatophyline genitalia were "much as in the Anthocoridae."

China and Myers' (1929) seminal paper on the classification of the cimicoid families, reappraised the relationships of the termatophylines, and placed them within the Miridae. They concluded that apart from the anthocorid-type head and the short first labial segment, the termatophylines were conclusively mirids, and treated them as a subfamily. They indicated that the porrect head condition occurs in the Cylapinae, and noted its similarity to termatophylines. Carvalho (1951, 1952) analyzed the position of the termatophylines, and concluded that they were a tribe of Deraeocorinae on the basis of the basally cleft claws and setiform parempodia. He differentiated them from other deraeocorines by the porrect head, large eyes, short antennae, and small body size. Carvalho (1955a) provided a key to the termatophyline genera, recognizing seven genera, *Hesperophylum, Termatophylidea, Arygrotelaenus, Conocephalocoris, Termatophylella, Termatophyloides* and *Termatophylum.* He distinguished the genera mostly on head and pronotal characters, and the short antennae.

Aside from Wagner (1970), who retained the termatophylines as a family, no subsequent author has deviated from the tribal placement of this group within the Deraeocorinae. Other works mostly include descriptions of new genera and species. Carvalho (1955b) described new taxa from the Neotropical region, recognizing two new genera, *Termatophyloides* and *Termatophylella,* from Central America, and two new species of *Termatophylidea.* Miyamoto (1965) gave detailed descriptions of two new termatophylines from Japan, providing adequate genitalic and habitus illustrations. Maldonado (1970) reviewed the distinctive genus *Termatophylidea,* describing three new species, with a key to all known species. Carvalho (1988) described a new genus, *Termatophylina,* from India, and gave illustrations of the male genitalia. Linnavuori (1974) described a new species of *Termatophylum* from Nigeria, and gave a key to the African species. Poppius (1910, 1915), China (1929), Usinger (1935), Carvalho (1983) and Ren (1983) described the other species.

BIOLOGY

The little that is known of the biology of Termatophylini suggests that the species are predators (Callan 1975). In Table 1 the biological information that is known is listed, including prey and plant associations. This information was taken from the literature and label data. Myers (1935) was the first to report termatophylines as predators, describing *Termatophylidea pilosa* as an important predator of the cacao thrips, *Selenothrips rubrocinctus* (Giard), a serious pest of cacao in the tropical parts of the Neotropical region. Callan (1943, 1975) and van Doesburg (1964) recorded other *Termatophylidea* species as predators of thrips. Both *T. maculata* and *T. opaca* are also predators of the cacao thrips, and Callan (1975) reported that the former species also feeds on the larvae of the grass thrips, *Calliothrips insularis* (Hood). There are indications that other termatophylines feed on moth larvae. *Kundakimuka queenslandica* feeds on the xyloryctine moth, *Xylorycta luteotactella* (Walker), which feeds on a paperbark species, *Melaleuca integrifolia.* I have examined specimens of *Termatophylina indiana* from the Natural History Museum, which has the label data: "associated with larval galleries of *Lamida moncusalis,*" which suggests that termatophylines may commonly feed on moth larvae.

The termatophylines are found in a variety of habitats, including flowers, foliage and moth larval galleries. Five termatophyline species, *Kundakimuka queenslandica, Termatophyloides pallipes, T. pilosulus, Termatophylidea maculata* and *T. opaca,* have been found on leaves, with the last two species restricted to the underside of leaves (van Doesburg 1964, Callan 1975). Two species of *Termatophylum, T. hikosanum* and *T. melaleucae,* have been collected from flowers. Van Doesburg (1964) reported that *T. opaca* and its prey were found under fine spider webs. The association of *Termatophylina indiana* with moth larval galleries, suggests that termatophylines may be commonly encountered in sheltered microhabitats. The prey of *Kundakimuka queenslandica, Xylorycta luteotactella,* is also known to live in small tunnels, which the moth bores in the branches of their food plant (Common 1990). Also of interest is the frequency with which termatophylines are found at light. Five species of the genera *Kundakimuka, Termatophylidea* and *Termatophylum* have been taken at light or in light traps. This suggests that the termatophylines are nocturnal predators. This hypothesis is morphologically supported by the presence of very large eyes, with enlarged ommatidia. There is no evidence of *Termatophylina indiana* being collected at light, which is the only termatophyline taxon that does not have enlarged ommatidia, and the eyes are of moderate size.

Termatophylines are known from a wide variety of plants. They have been recorded from three monocot families, the Gramineae, Musaceae and Orchidaceae, and seven dicot families, the Anacardiaceae, Betulaceae, Bombacaceae, Compositae, Leguminosae, Myrtaceae and Sterculiaceae (Table 1). The association of termatophylines with monocots is restricted to the Neotropical genera *Termatophylella, Termatophylidea* and *Termatophyloides.* There is no apparent overall pattern of plant association in the termatophylines, with some species having multiple plant associations, and *Termatophylidea opaca* known from both a monocot and dicot. Some sympatric termatophyline taxa are found on the same plant genera: *Arygrotelaneus simoni* and *Termatophylum insigne* are both known from *Acacia* species, and *Kundakimuka queenslandica* and *Termatophylum melaleucae* are known only from *Melaleuca* species.

SYSTEMATICS

Tribe Termatophylini

Termatophylina: Reuter 1884b: 167; Reuter 1884a: 218 (subfamily of Anthocoridae).

Termatophylidae: Reuter 1910: 70 (family status); Poppius 1910: 56; Reuter and Poppius 1912: 2 (diagnosis); Reuter 1912: 52 (key; diagnosis); Parshley 1923: 665 (description); Wagner, 1970: *** (footnote).

Termatophylinae: China and Myers 1929: 97 (subfamily of Miridae).

Termatophylini: Carvalho 1951: 133 (tribe of Deraeocorini); Carvalho 1952: 32, 42, 43, 50 (checklist); Carvalho 1955a: 22 (generic key); Carvalho 1957: 34 (catalogue).

Diagnosis.—The Termatophylini are best diagnosed by the short first labial segment (Figs. 19–20) which does not extend beyond the posterior margin of the bucculae. The head is moderately (Figs. 11, 14, 16, 17) to strongly porrect (Figs. 12, 13, 15, 18), with the apex of the clypeus in lateral view terminating above or at level of the antennifers (Figs. 11–18). Unlike any other Deraeocorinae the metathoracic spiracle is external (= visible) as an oval or lanceolate opening, usually bounded by evaporative bodies on the dorso-caudal arm of the dorsal margin of the mesepimeron (Figs. 65, 67, 68). The pronotum has antero-lateral projecting setae on the anterior angles of the callosite region (Figs. 32–34).

Description.—Macropterous, either smooth or coriaceous; ovoid (Fig. 1), elongate-ovoid (Fig. 2), or parallel-sided; mostly with rows of punctures on pronotum (Figs. 31, 33, 34, 38–42) and hemelytra (Figs. 47, 51–56); sparse to dense cover of setiform vestiture, rarely intermixed with adpressed, flattened scalelike setae. *Head:* moderately (Figs. 11, 14, 16, 17) to strongly (Figs. 12, 13, 15, 18) porrect; elongate (Figs. 4, 5, 7, 10) or transverse (Figs. 3, 6, 8, 9); vertex rounded, flattened, or narrowly bicompressed, posterior margin sometimes weakly carinate; frons moderately to strongly narrowed in front, barely to weakly declivent; clypeus short, weakly to moderately declivent, terminating above (Figs. 12, 13, 15) or at level of antennifers (Figs. 11, 14, 16, 17, 18) in lateral view; bucculae usually short and terminating caudally at or just beyond antennifers, most often very narrow, with lateral margins either subparallel (Figs. 20, 22, 23), weakly to moderately arcuate (Figs. 19, 21, 26) sometimes strongly

Table 1. List of prey, habitats and habits, and plant associations of Termatophylini species.

Termatophylini Species	Termatophylini Prey	Habitats and Habits	Plant Association	Reference
Arygrotelaenus simoni			*Acacia* sp. [Leguminosae]	Linnavuori 1975, 1989
Kundakimuka carvalhoi		at light		label data
Kundakimuka pallipes		sweeping herbs		Miyamoto 1965
Kundakimuka queenslandica	*Xylorycta luteotactella* [Lepidoptera]	on foilage	*Melaleuca integrifolia* [Myrtaceae]	label data
Termatophylella fulvoides			Orchidaceae	Carvalho 1955b
Termatophylidea brunnea		at light		Maldanado 1970
Termatophylidea constricta			*Pachira insignis* [Bombacaceae]	Maldonado 1970
Termatophylidea hyalina		at light		Maldonado 1970
Termatophylidea maculata	*Selenothrips rubrocinctus* [Thysanoptera]	on underside of leaves	*Theobroma cacao* [Sterculiaceae], *Anacardium occidentale* [Anacardiaceae]	Callan 1943, 1975
	Calliotrhips insularis [Thysanoptera]		*Alnus acuminata* [Betulaceae]	Usinger 1935
			Gramineae	Callan 1975
Termatophylidea ocellata			*Vernonia brachiata* [Compositae]	Carvalho 1955b
Termatophylidea opaca	*Selenothrips rubrocinctus* [Thysanoptera]	on underside of leaves ?gregarious		van Doesburg 1964, Callan 1975
Termatophylidea pilosa	*Selenothrips rubrocinctus* [Thysanoptera]			Myers 1935, Callan 1975
Termatophylina indiana		associated with larval galleries of *Lamida moncusalis* [Lepidoptera]		label data
Termatophyloides pilosulus		on herbs		Carvalho 1955b
Termatophylum hikosanum		on tree blossom	Orchidaceae *Musa* sp. [Musaceae]	Miyamoto 1965
Termatophylum insigne			*Acacia* sp. [Leguminosae]	Linnavuori 1989
Termatophylum melaleucae		on racemes at light in rainforest	*Melaleuca integrifolia, M. quinquenervia* [Myrtaceae]	label data
Termatophylum weiri		at light in rainforest		label data

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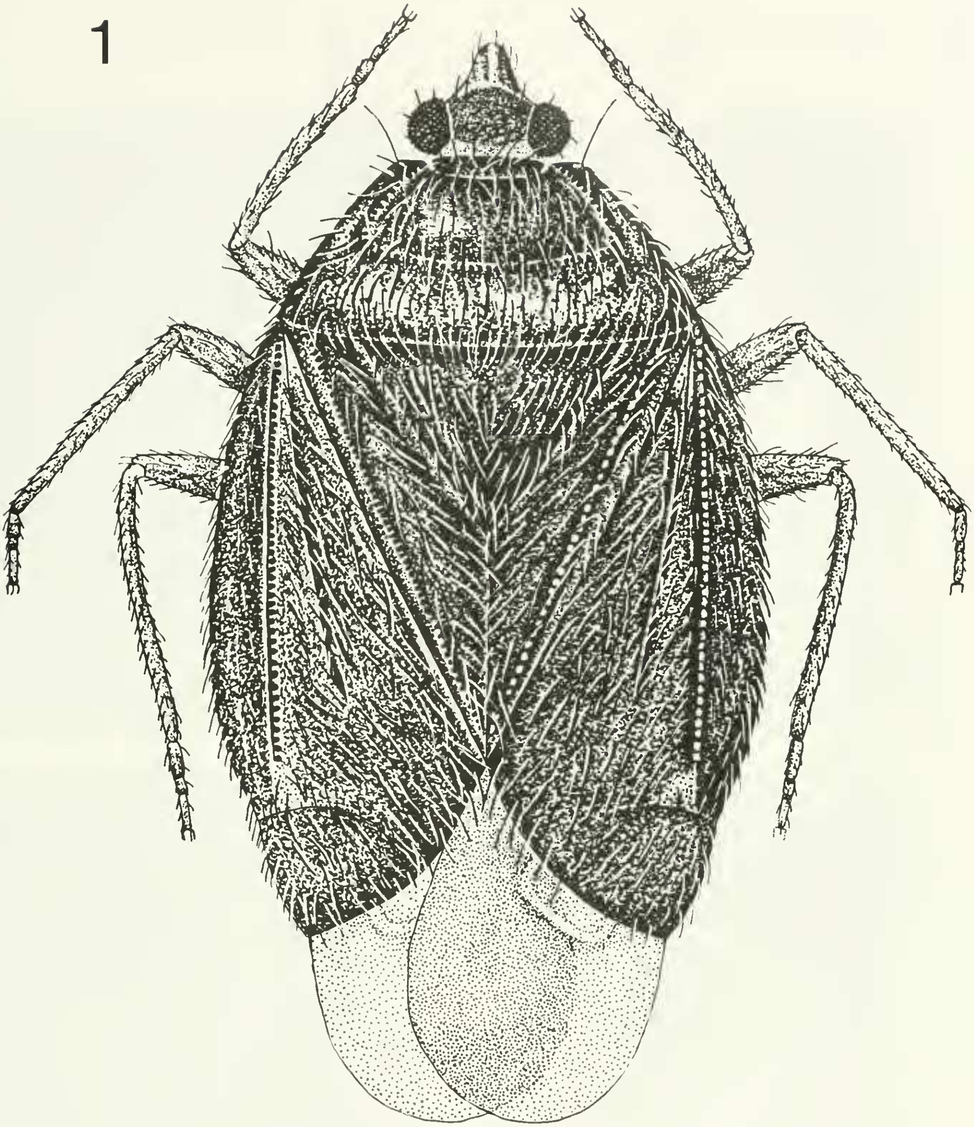

Fig. 1. *Democoris lugens*, dorsal habitus of female.

arcuate (Fig. 24), and in one case extremely broad, laterally almost contiguous with antennifers, with margins also explanate (Fig. 25); gula elongate, narrow (Figs. 22, 23) to moderately broad (Figs. 19, 20, 21, 24), concave (Figs. 19, 20, 22–26) to weakly convex (Fig. 21), often with transverse ridges, margins rarely carinate, sometimes with rows of setae on lateral margins, rarely with a dense matt of whitish, microsetae (Figs. 22, 23). *Eyes:* moderately sized (Figs. 12, 13, 15, 17, 18) to very large (Figs. 11, 14, 16), most often contiguous, or nearly so, with pronotal collar, rarely removed; ommatidia usually very large, rarely small (Fig. 13), with short to elongate setiform interocular setae (Figs. 11–14). *Antennae:* inserted below midheight of eyes; usually short; mostly

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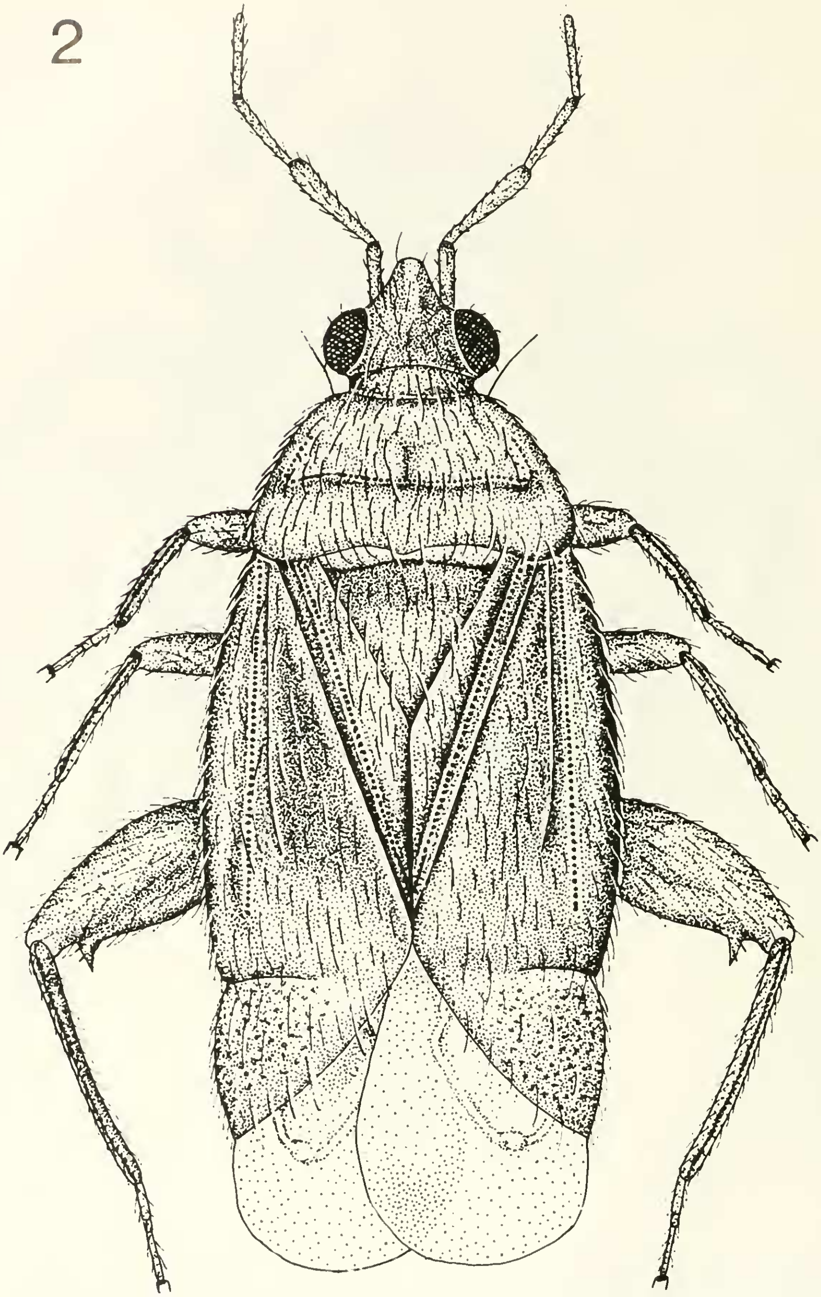
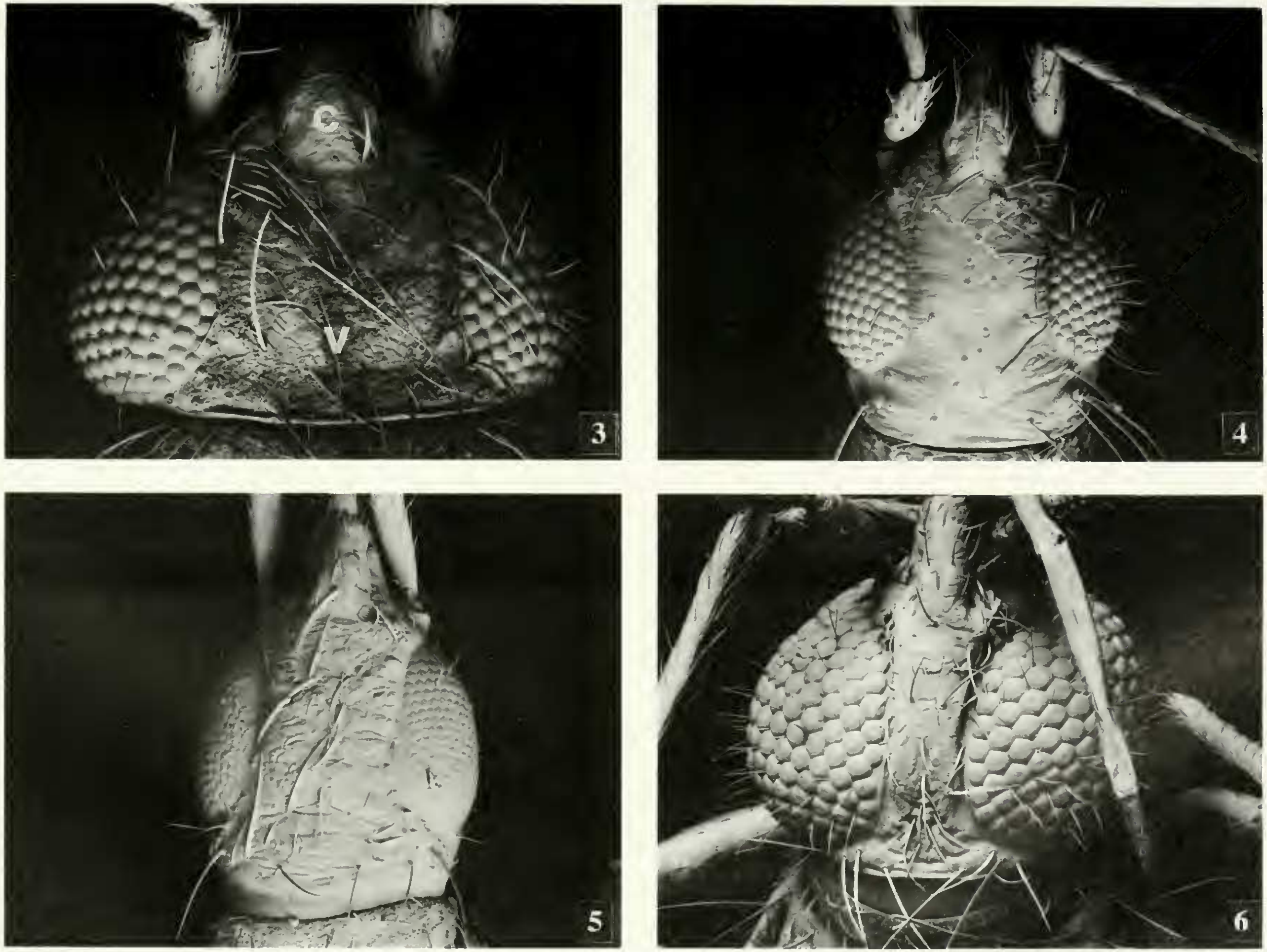
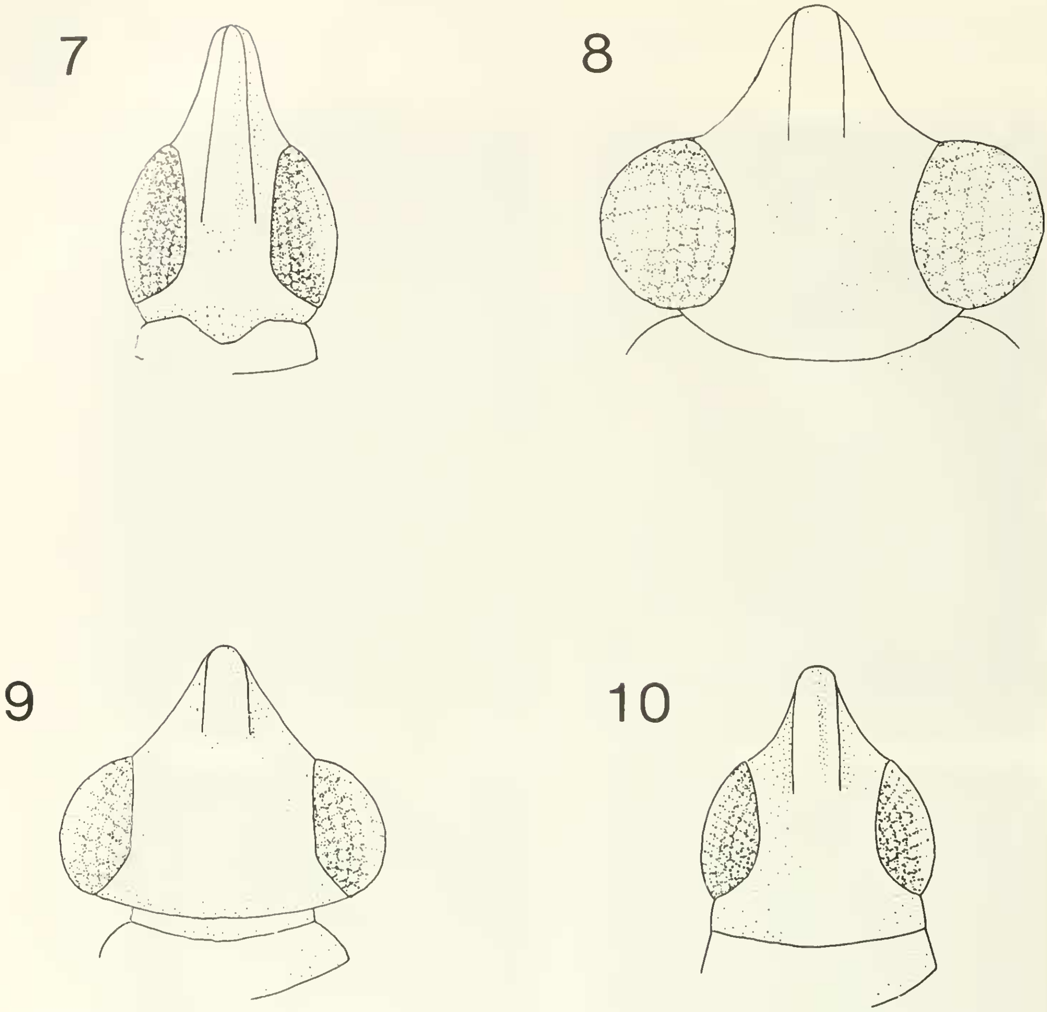


Fig. 2. *Kundakimuka carvalhoi,* dorsal habitus of male.

with AIII and AIV thinner than AI and AII; with setiform vestiture, usually longer than width of segments, rarely intermixed with minute, flattened, adpressed setae on AII; AI usually short, barely surpassing apex of clypeus, rarely moderately surpassing tip of clypeus in females, moderately to greatly thickened; AII usually longest segment, usu-

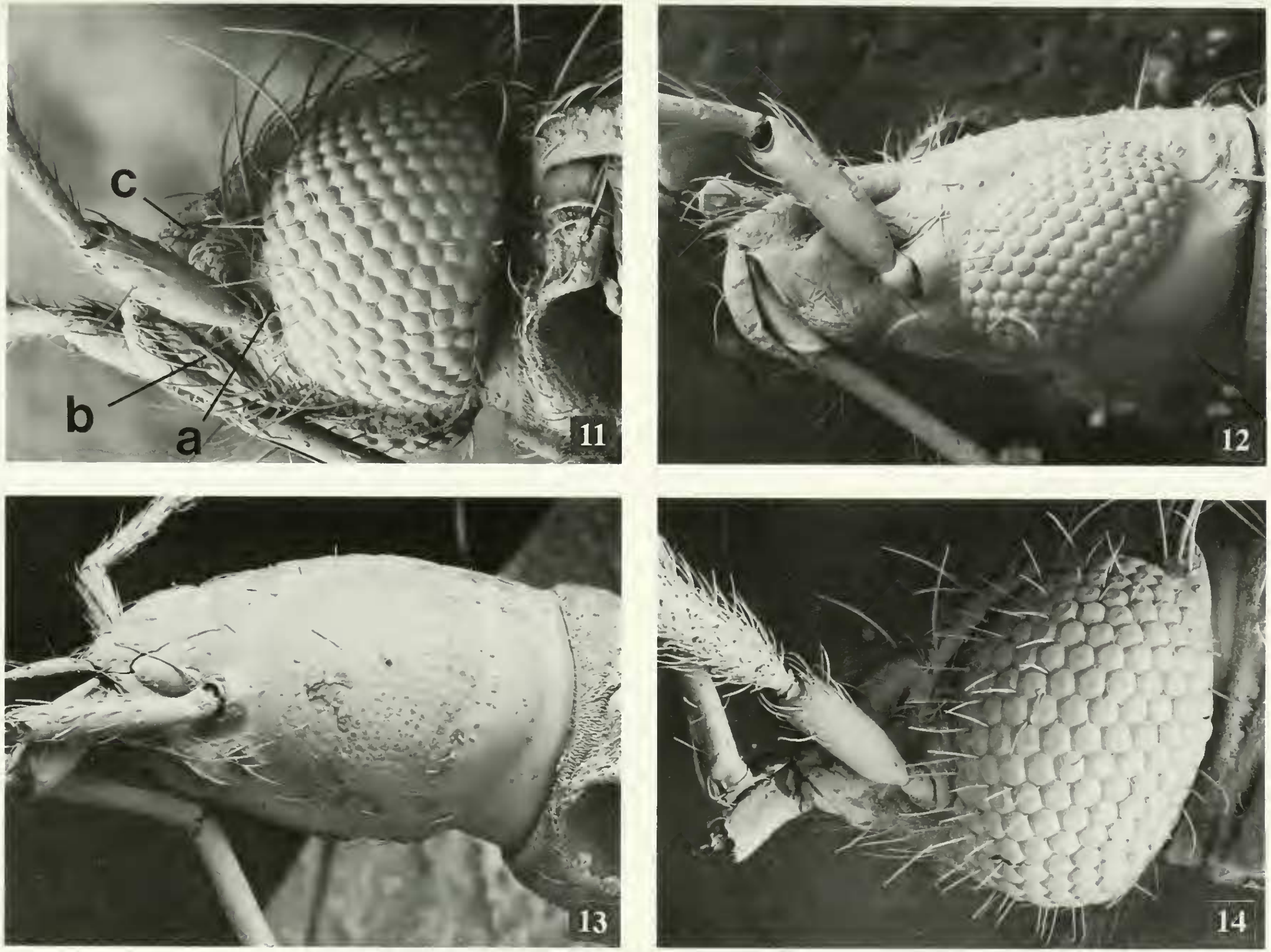


Figs. 3–6. Dorsal view of head. 3, *Kundakimuka queenslandica,* male. 4, *Termatophylidea* sp., female. 5, *Termatophylina indiana,* female. 6, *Termatophylum melaleucae,* male; c = clypeus, v = vertex.

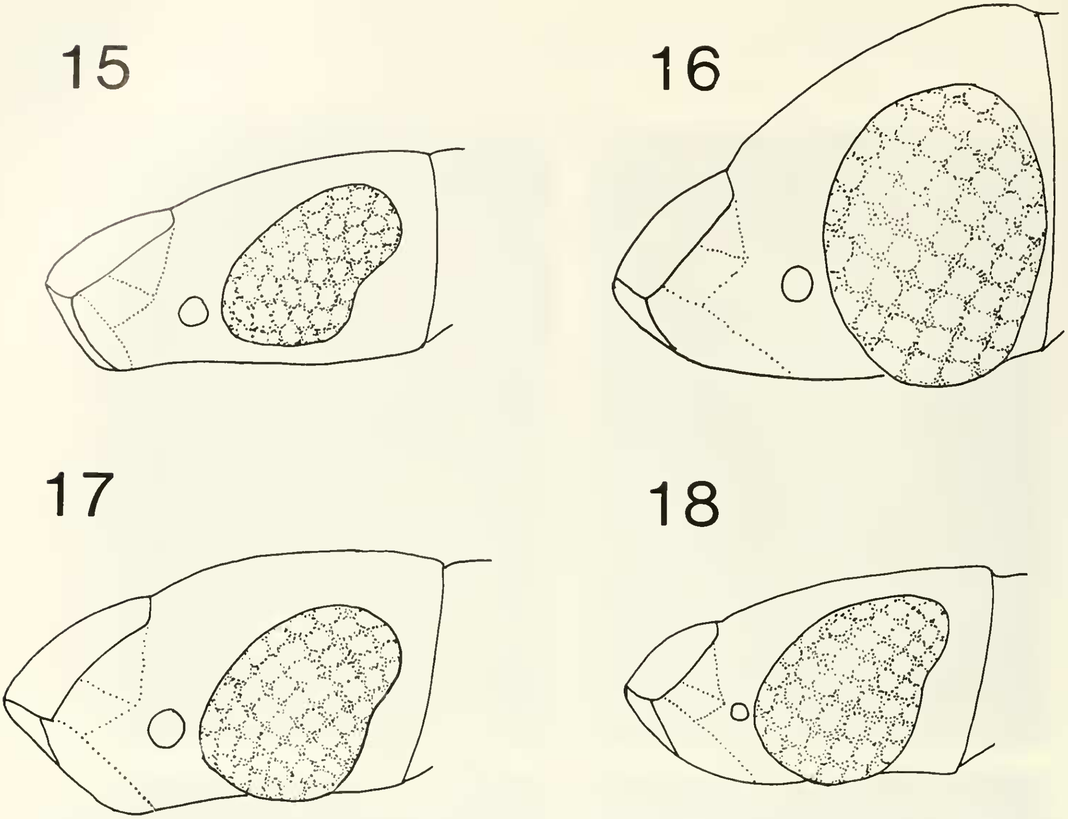


Figs. 7–10. Dorsal view of head. 7, *Arygrotelaenus elegans*, female. 8, *Democoris lugens*, female. 9, *Termatophylella fulvoides*, male. 10, *Termatophyloides pilosulus*, male.

ally cylindrical and weakly incrassate apically (Figs. 27–29), sometimes fusiform and swollen in males (Fig. 30), and if so, only incrassate in females; AIII cylindrical, either subequal in length to AII to much shorter; AIV weakly fusiform, subequal in length to shorter than AIII. *Labium:* inserted terminally on head, above or at the antennifers in lateral view (Figs. 11–14), slender, sometimes fragile, usually reaching apices of forecoxae, at most posterior margin of mesosternum; LI very short and narrow, never surpassing posterior margin of bucculae (Figs. 19, 20); LII usually longest segment. *Pronotum:* tripartite, subtrapezoidal (Figs. 31–34, 39–42); lateral margins linear, weakly to strongly divergent posteriorly; flattened (Figs. 31, 43), evenly tumid (Fig. 40), or biconvex with callosite and disc regions separated by deep incision (Figs. 32, 46); pronotal collar rounded, moderately elongate (Figs. 31–34, 39–42), width variable reaching midwidth of eyes to maximum eye width, posterior margin marked by a shallow to deep groove, which is punctate (Figs. 31, 33, 34, 35, 40, 42) or non-

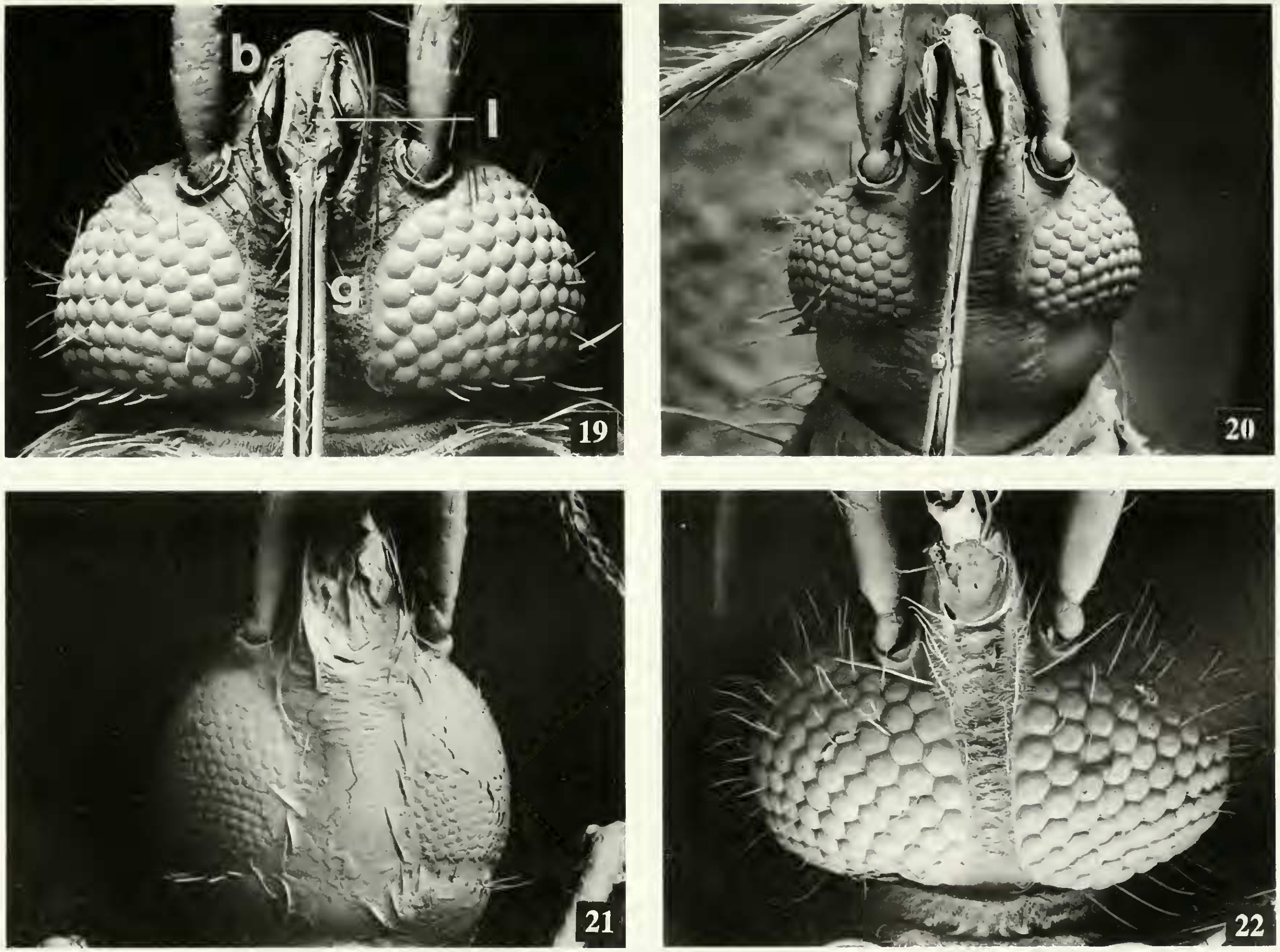


Figs. 11–14. Lateral view of head. 11, *Kundakimuka queenslandica,* male. 12, *Termatophylidea* sp., female. 13, *Termatophylina indiana,* female. 14, *Termatophylum melaleucae,* male; b = bucculae; c = clypeus; a = antennifers.

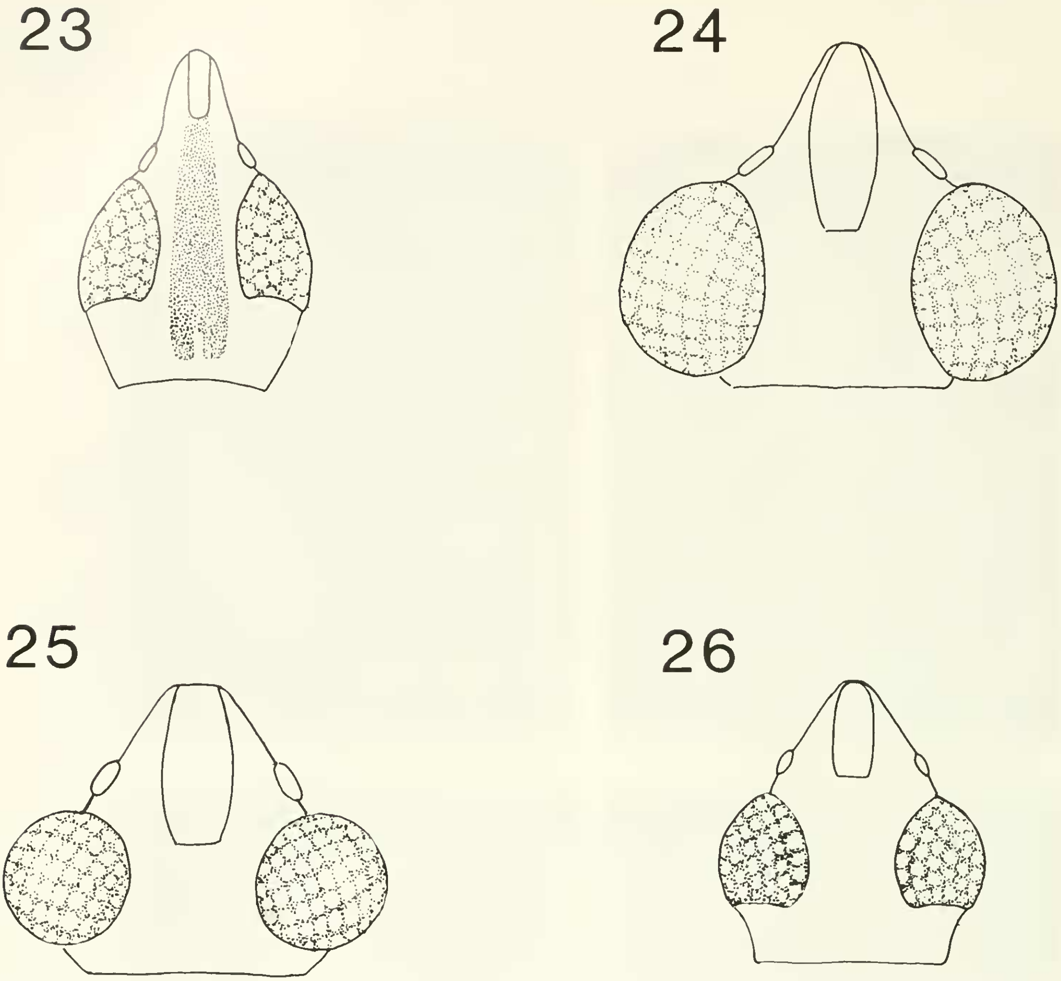


Figs. 15–18. Lateral view of head. 15, *Arygrotelaenus elegans,* female. 16, *Democoris lugens,* female. 17, *Termatophylella fulvoides,* male. 18, *Termatophyloides pilosulus,* male.

punctate (Figs. 32, 39, 41); callosite region separated by a shallow to deep transverse groove, submarginally directed anteriorly, usually meeting pronotal collar (Figs. 31–34, 39–42), groove usually punctate (Figs. 31, 33–35, 40, 41, 42) rarely with conical, tumid processes (Figs. 32, 36), sometimes callosite region demarcated along midline by a short row of punctures (Figs. 37, 42), with calli clearly separated; antero-lateral pronotal setae, placed dorsad to tergopleural suture, and either anteriad or posteriad to propleural suture; disc usually longer than callosite region, sometimes subequal in length, rarely shorter, most often obliquely raised above callosite region, posterior margin truncate, or weakly bisinuate. *Scutellum:* triangular, flattened to moderately rounded, sometimes with lateral margins punctate; anterior margin rarely with small tubercles (Fig. 38). *Hemelytra:* margins parallel-sided to strongly arcuate (Fig. 1), usually not greatly extending laterally beyond posterior angles of pronotum, rarely much broader; clavus nearly always with a punctate anal vein (Figs. 47, 51–56), sublaterally placed, rarely anal vein as a sinuate groove (Figs. 49, 50); embolium either narrow (Figs. 48, 51, 54, 55, 56), usually less wide than length of pronotal collar, to very broad, subequal to or greater than length of pronotal collar (Figs. 47, 52, 53); corium mostly with a punctate R+M vein (Figs. 47, 51–56), variable in length, from midlength of corium to just anteriad to cuneal fracture, either shorter (Figs. 51, 56) or longer than medial flexion line (Figs. 47, 48, 52–55), sometimes median flexion line very short (Fig. 49); me-

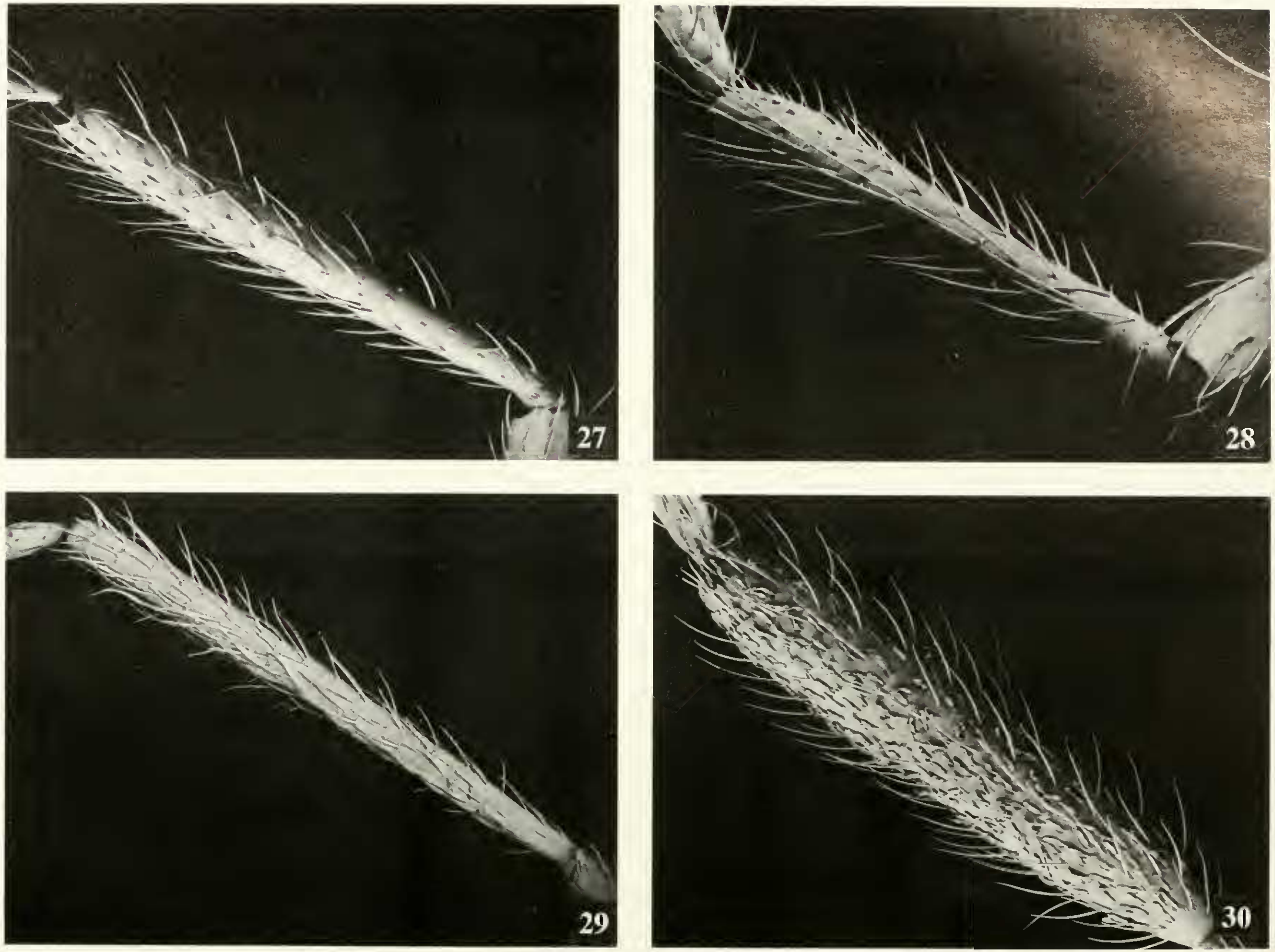


Figs. 19–22. Ventral view of head. 19, *Kundakimuka queenslandica,* male. 20, *Termatophylidea* sp., female. 21, *Termatophylina indiana,* female. 22, *Termatophylum melaleucae,* male; b = bucculae; g = gula; l = first labial segment.

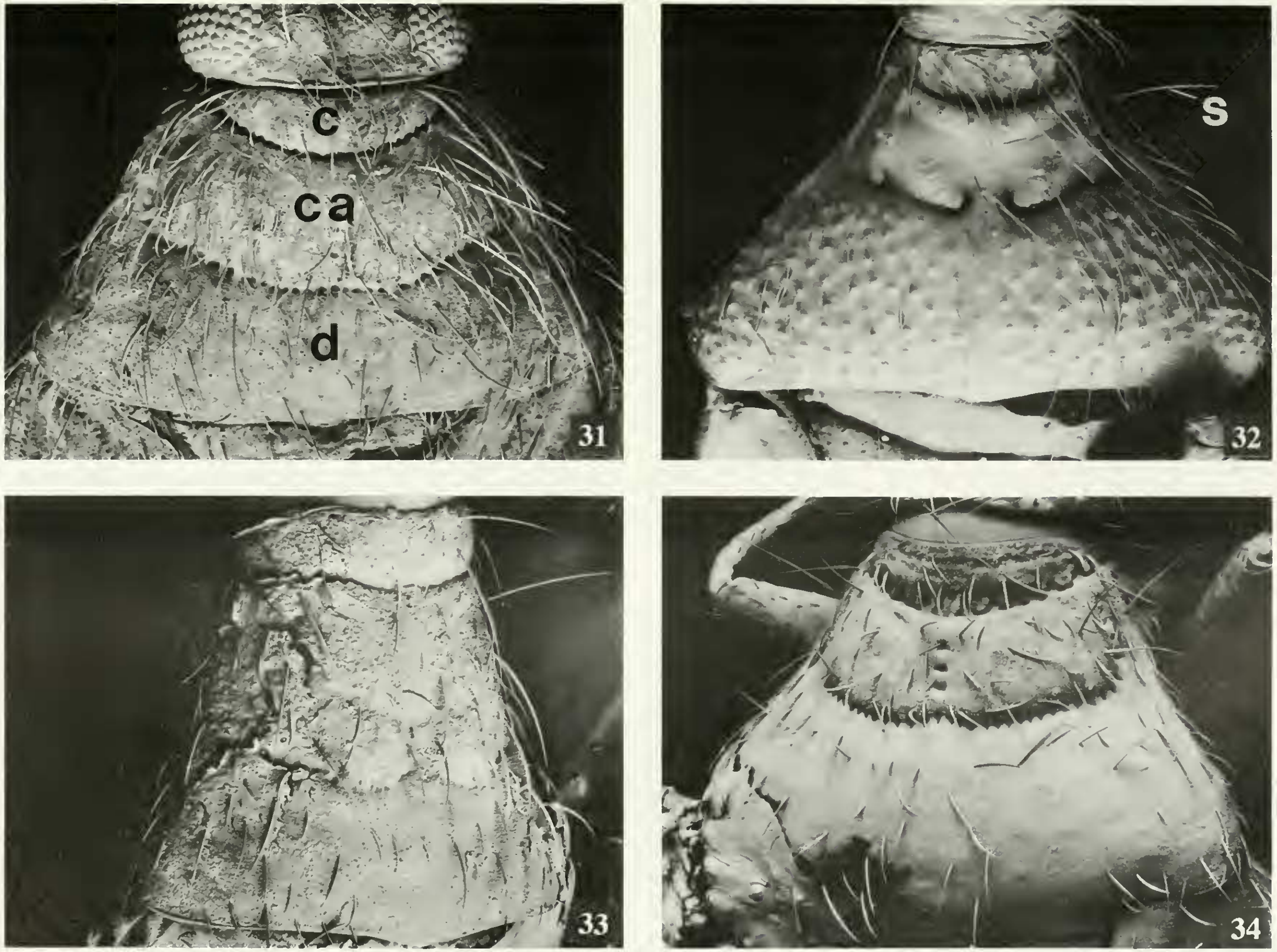


Figs. 23–26. Ventral view of head. 23, *Arygrotelaenus elegans,* female. 24, *Democoris lugens,* female. 25, *Termatophylella fulvoides,* male. 26, *Termatophyloides pilosulus,* male.

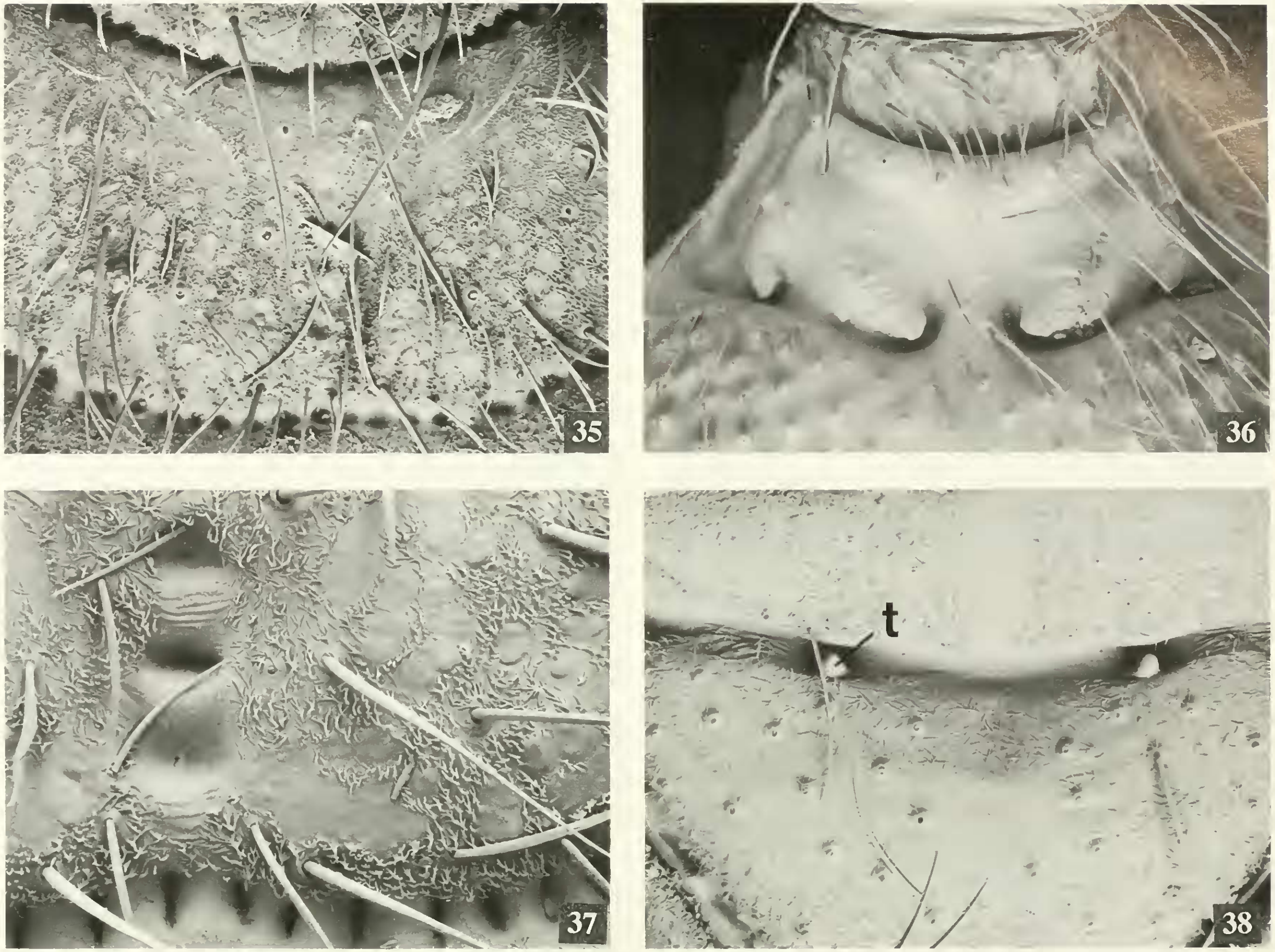
dial flexion line mostly subparallel, and weakly divergent posteriorly to R+M vein, or strongly divergent from origin; cuneus mostly as long as wide; membrane either hyaline, translucent or opaque, concolorous or with bicolored pattern; usually glabrous, rarely with dense cover of microsetae; membrane with one cell, very narrow (Figs. 52, 53) to broad (Figs. 48, 54), subelliptical to subquadrate; membrane vein sometimes obscure (Fig. 51), often with an indistinct swelling subcaudally adjacent to cuneus. *Thoracic pleura:* tergopleural suture usually distinct as a groove anteriad to propleural suture (Figs. 43–46), posteriorly evident as a weak depression, sometimes as a pit above propleural suture; propleural suture most often distinct, sometimes obscure; proepisternum short, subtriangular or subquadrate, explanate; proepimeron large, subtriangular, strongly depressed mesally, sometimes with one or two pits (Figs. 44, 46); mesepimeron usually polished, rarely rugose, variable, either short and subquadrate (Figs. 57, 60, 61–64), or large and elongate (Figs. 58, 59), with dorsal margin angulate, and dorso-caudal arm bearing an oval to lanceolate spiracular opening (Figs. 65, 66, 67), or recessed and not visible in lateral view (barely visible in latero-caudal view) (Fig. 68), spiracle nearly always bounded by evaporative areas (Figs. 65, 67, 68), in one case absent (Fig. 66), ventral margin of mesepimeron often obscure, at most as a weak depression, sometimes with vestiture; metepisternum bipartite, with a well developed metathoracic gland scent efferent system (Figs. 57–64, 69–72), tumid, occupying about half of the segment, often dorsally contiguous with the mesepimeric evaporative areas (Figs. 57, 59, 63, 64), sometimes separated (Figs. 60–62), peritreme usually placed on mid-length of scent efferent system (Figs. 58, 70, 60, 72, 61) sometimes just caudad of mid-line (Figs. 57, 69, 62, 63, 64), rarely along posterior margin of metepisternum (Figs. 59, 71), peritreme tonguelike (Figs. 69, 70) or fingerlike (Fig. 72), mostly polished, with microsetae, mostly straight, rarely weakly arcuate dorsally (Figs. 62, 64), often with posterior margin raised above plane of evaporative areas, rarely with apex raised; evaporative bodies either elongate (Figs. 73, 74, 76) or subquadrate (Fig. 75), caps mostly widely separated; remainder of metepisternum depressed relative to scent efferent system, margins rounded. *Legs:* usually of moderate length, rarely elongate; metatrochanters rarely with minute spine (Fig. 83); femora mostly fusiform, rarely elongate and cylindrical, with metafemora rarely greatly enlarged (Fig. 83), and armed with spinelets (Figs. 81–82) or large spine distally on the ventral surface (Figs. 83–84); three or four ventral mesofemoral and four to six ventro-subdistal metafemoral trichobothria (Figs. 77–80), intermixed with moderate to sparse cover of semierect setiform vestiture; tibiae mostly cylindrical, sometimes weakly subquadrate, sometimes with rows of spinelets (Figs. 86–88), rarely without rows of spines (Fig. 85), always with moderate to sparse cover of semiadpressed setiform vestiture, foretibiae always with a well-developed tibial comb; tarsi cylindrical, with TI and TII subequal in length, TIII longest segment, always with semiadpressed setiform vestiture; pretarsus with basally toothed claws, mostly with setiform parempodia (Figs. 90, 96, 91, 97, 92, 98), sometimes parempodia flattened and ribbonlike (Figs. 89, 95, 93, 99, 94, 100), rarely weakly flattened with apices expanded, without pulvilli or pseudopulvilli. *Abdomen:* depressed, very broad, shiny, anthocoridlike, usually with regular distribution of semiadpressed semierect setae, often intermixed with elongate trichobothrialike setae laterally on terminal segments, abdomen rarely narrow and cylindrical. *Male genitalia:* genital capsule small, conical (Fig. 101), genital opening dorso-caudal (Fig. 102), small, narrow, ventral margin carinate, obliquely raised from left to right; tergite X large, mostly free, rarely partially fused to left dorsal margin of genital opening; left paramere (Figs. 103–110) placed in a weak excavation of ventro-sinistral corner of genital opening (Fig. 101), sensory lobe very small, with a few sensory hairs on outer margin, shaft arcuate, in resting position at 45° to ventral margin of genital opening (Fig. 102), directed dextrally, apex of shaft either spatulate (Figs. 106, 109) or evenly tapered (Figs. 103–105, 107, 108, 110); right paramere very small, apically tapered, placed in ventro-dextral corner of genital opening; aedeagus directed sinistrally in resting position, crossing shaft of left paramere; phallotheca straplike, apically dissected, sclerotized, broadly connate with vesica and connected basally to phallobase by a thin membrane; vesica (Figs. 111–118) with one membranous lobe; ductus seminis terminating at base of lobe, without liplike sclerotized secondary gonopore, usually with gonopore opening into a gonoporal cavity, marked by a U or V-shaped field of spines; usually without sclerotized process (Figs. 111–113, 115–118), present in one genus (Fig. 114); lobal sclerites usually mesally placed, and linear



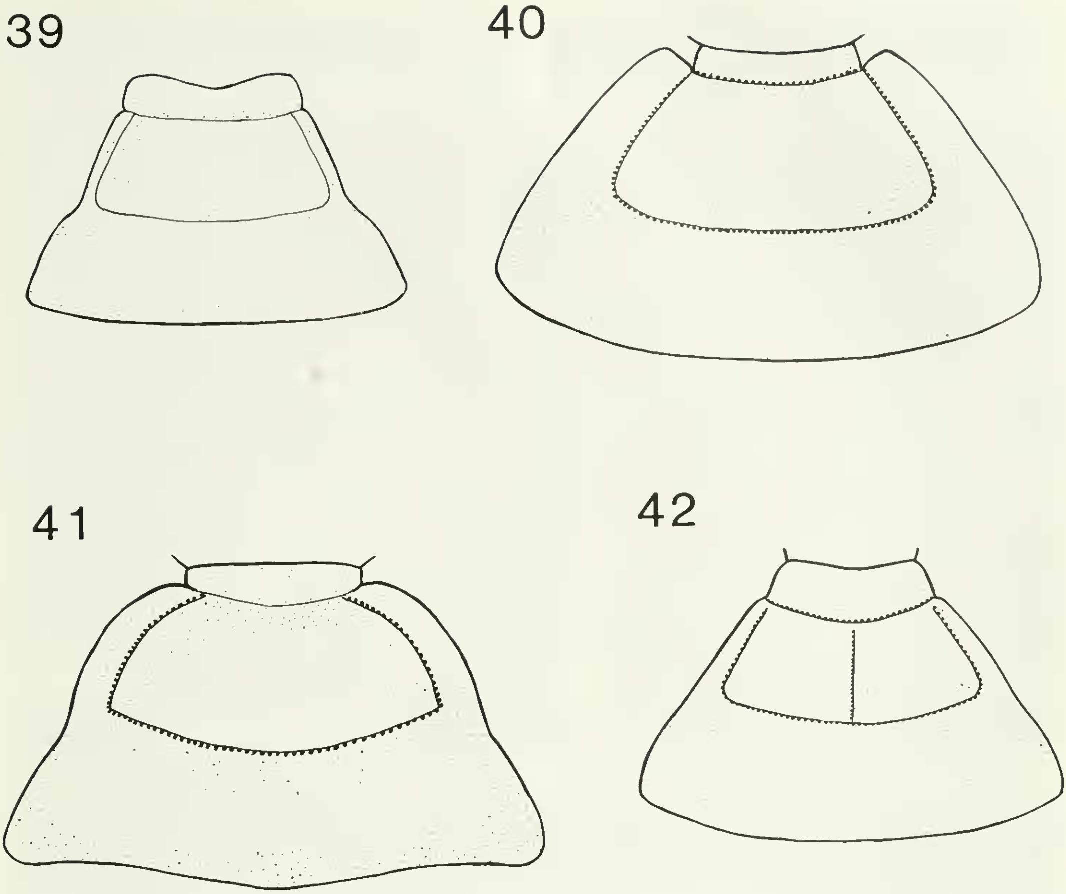
Figs. 27–30. Second antennal segment. 27, *Kundakimuka queenslandica,* male. 28, *Termatophylidea* sp., female. 29, *Termatophylina indiana,* female. 30, *Termatophylum melaleucae,* male.



Figs. 31–34. Dorsal view of pronotum. 31, *Kundakimuka queenslandica,* male. 32, *Termatophylidea* sp., female. 33, *Termatophylina indiana,* female. 34, *Termatophylum melaleucae,* male; c = collar; ca = callosite region; d = disc region, s = antero-lateral pronotal seta.



Figs. 35–38. Higher magnification of punctations and processes on posterior margin of pronotal collar and callosite region (Figs. 35–37); processes on anterior margin of scutellum (Fig. 38). 35, *Kundakimuka queenslandica*, male. 36, *Termatophylidea* sp., female, processes of pronotum. 37, *Termatophylum melaleucae*, male, midline of callosite region. 38, *Termatophylidea* sp., female, anterior margin of scutellum; t = tubercle.



Figs. 39–42. Dorsal view of pronotum. 39, *Arygrotelaenus elegans,* female. 40, *Democoris lugens,* female. 41, *Termatophylella fulvoides,* male. 42, *Termatophyloides pilosulus,* male.

to sublinear (Figs. 112, 113, 115) or sickle-shaped (Figs. 111, 116–118), and basally connected to apex of gonoporal cavity; apex of membranous lobe sometimes with fields of spines (Figs. 111, 116–118).

CHECKLIST OF THE TERMATOPHYLINI OF THE WORLD

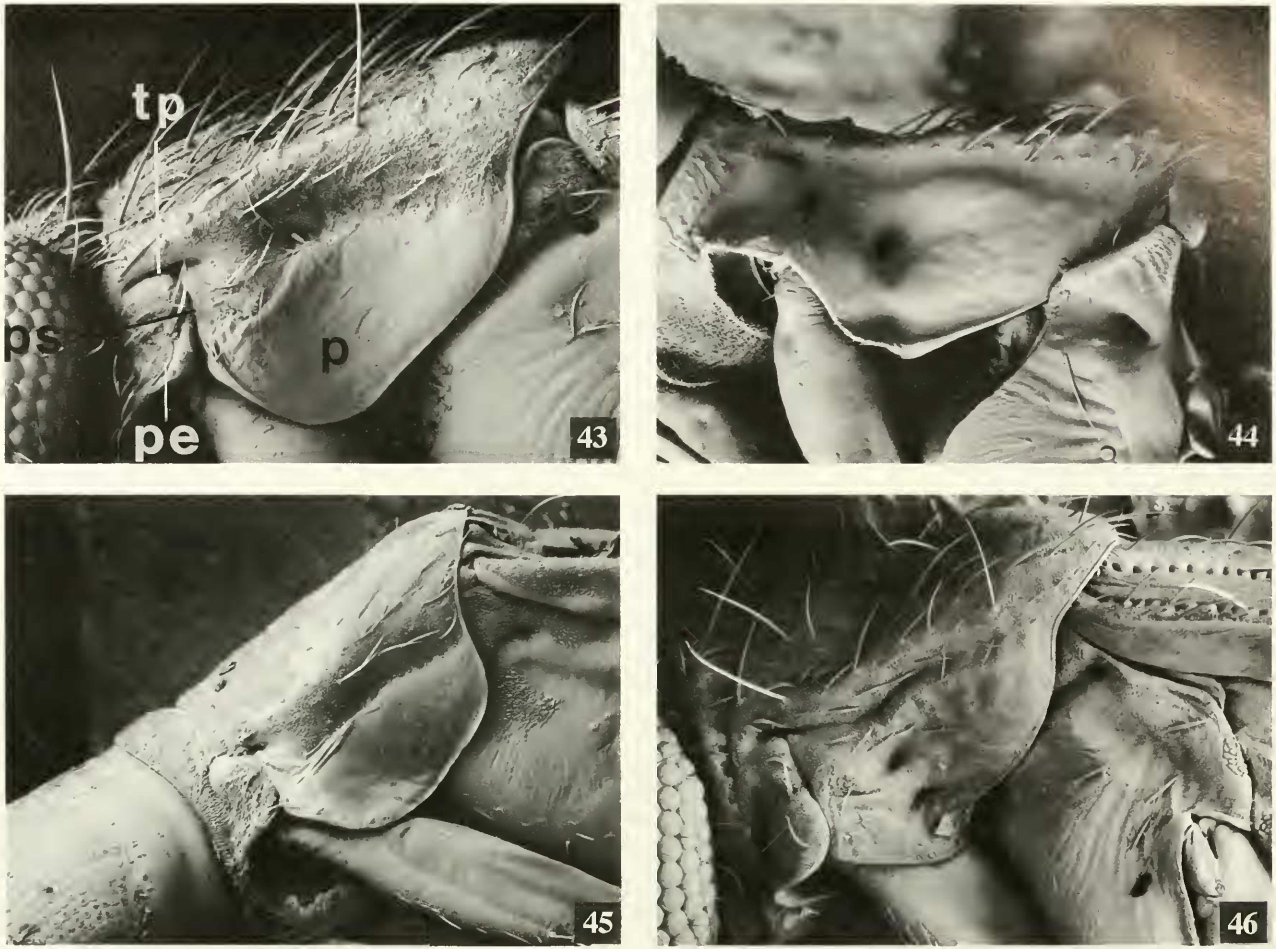
Arygrotelaenus Reuter and Poppius, 1912
  elegans Reuter and Poppius, 1912
    Egypt
  simoni Reuter and Poppius, 1912
    Middle East, Sudan

Democoris Cassis n. gen.
  lugens Cassis n. sp.
    Australia
  leptocytus Cassis n. sp.
    Australia

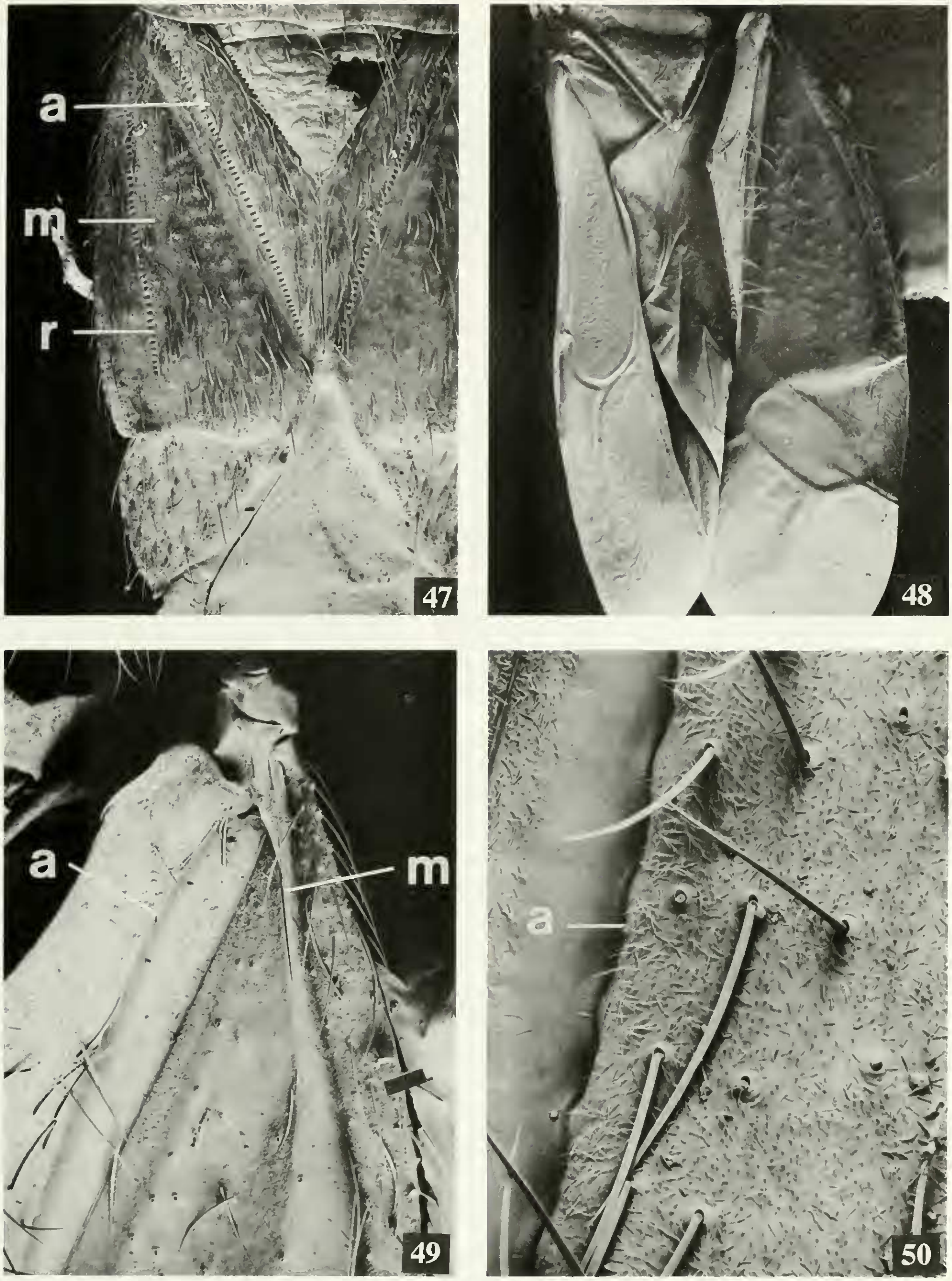
Kundakimuka Cassis n. gen.
  carvalhoi Cassis n. sp.
    Australia
  pallipes (Miyamoto, 1965) nov. comb.
    Japan
  queenslandica Cassis n. sp.
    Australia

Termatophylella Carvalho, 1955
  fulvoides Carvalho, 1955
    Mexico

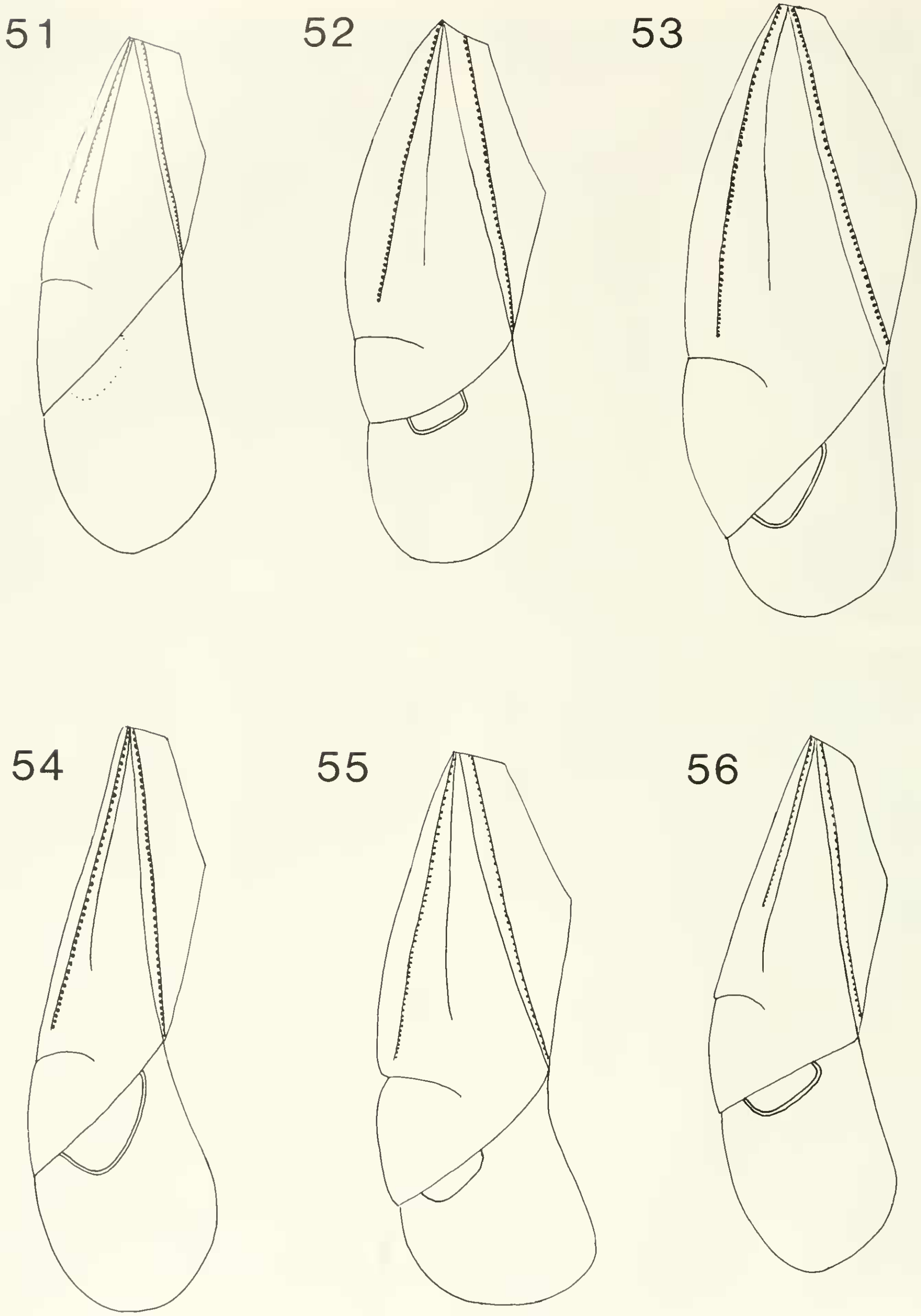
Termatophylidea Reuter and Poppius, 1912
  brunnea Maldonado, 1970
    Puerto Rico



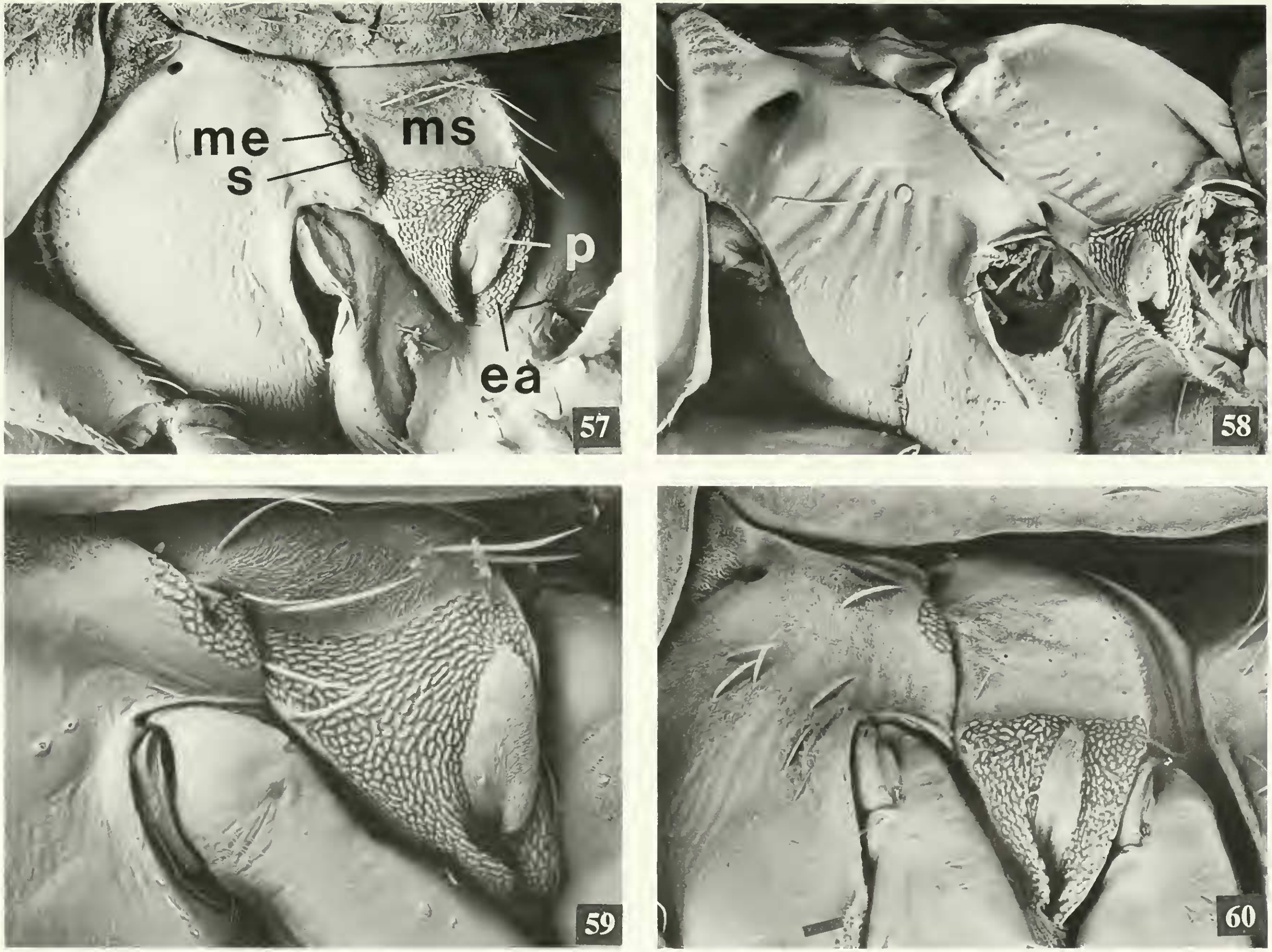
Figs. 43–46. Lateral view of pronotum. 43, *Kundakimuka queenslandica,* male. 44, *Termatophylidea* sp., female. 45, *Termatophylina indiana,* female. 46, *Termatophylum melaleucae,* male. pe = proepisternum; ps = propleural suture; p = proepimeron; tp = tergopleural suture.



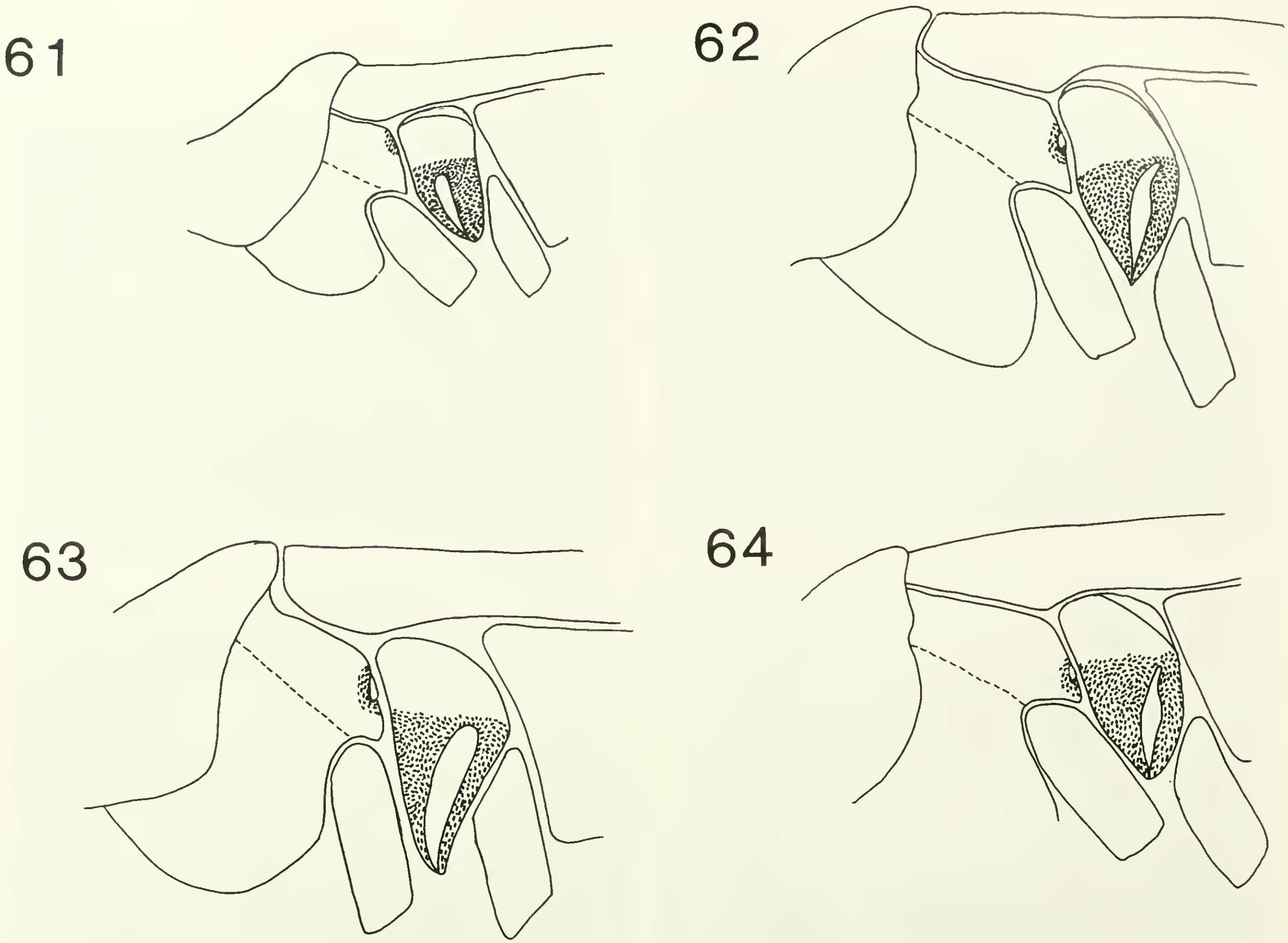
Figs. 47–50. Hemelytral characters. 47, *Kundakimuka queenslandica,* male, hemelytra. 48–50, *Termatophylidea* sp., female. 48, hemelytron. 49, anterior aspect of corium and clavus. 50, serrate anal vein of clavus. a = anal vein; m = median flexion line; r = R + M vein.



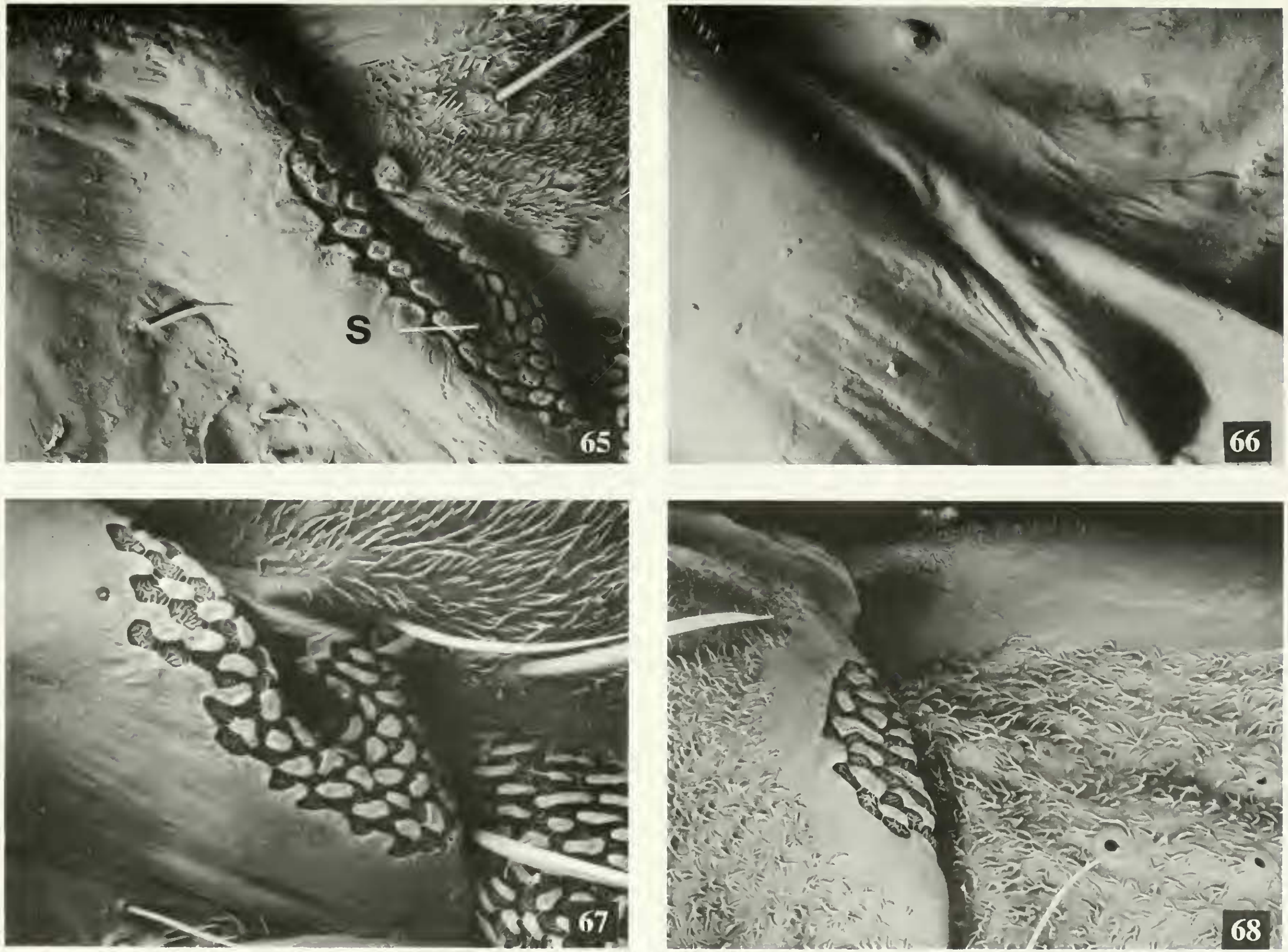
Figs. 51–56. Hemelytra. 51, *Arygrotelaenus elegans,* female. 52, *Democoris lugens,* female. 53, *Termatophylella fulvoides,* male. 54, *Termatophylina indiana,* male. 55, *Termatophyloides pilosulus,* male. 56, *Termatophylum insigne,* male.



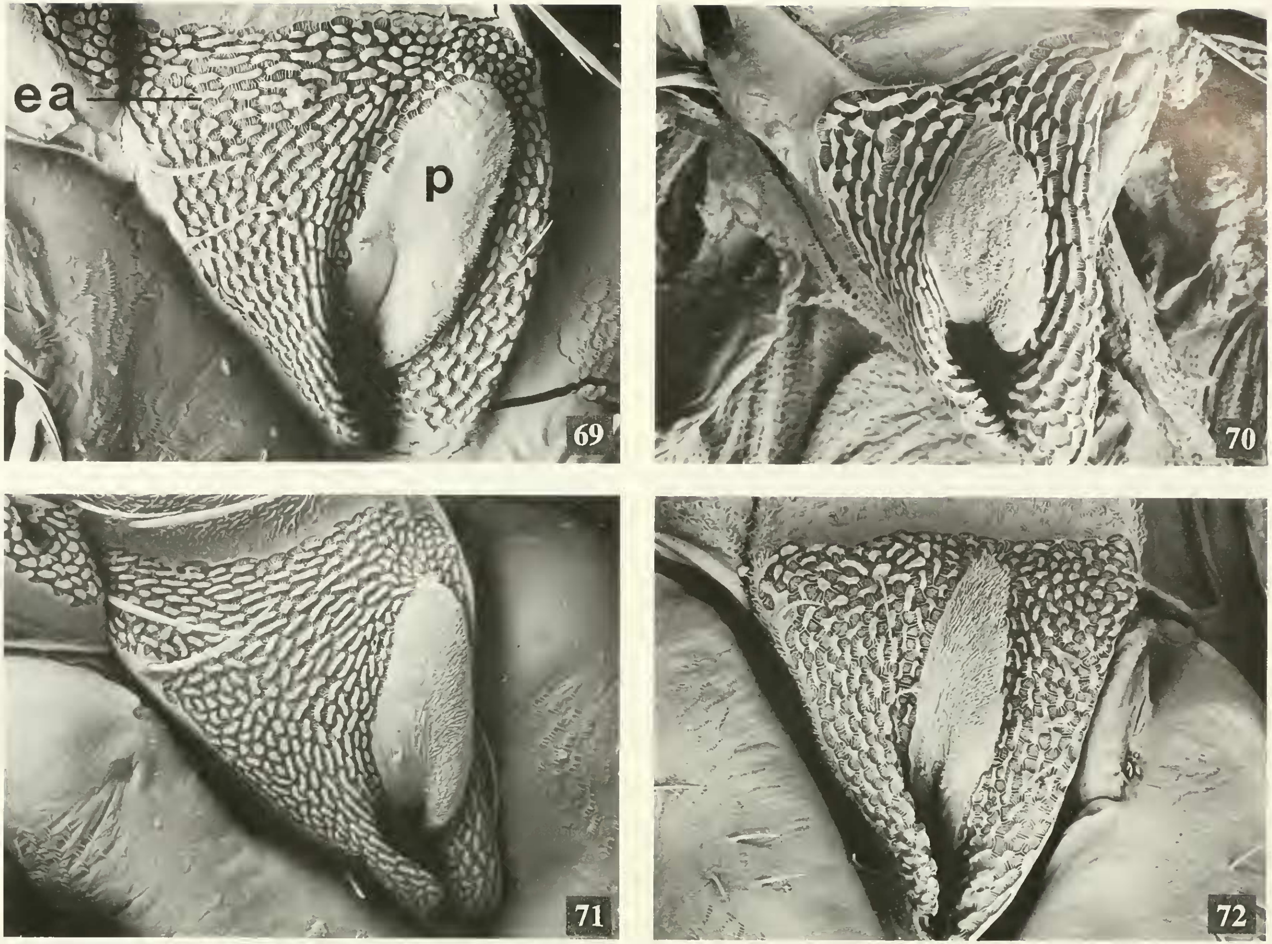
Figs. 57–60. Pterothoracic pleura. 57, *Kundakimuka queenslandica*, male. 58, *Termatophylidea* sp., female. 59, *Termatophylina indiana*, female. 60, *Termatophylum melaleucae*, male. ea = evaporative areas; me = mesepimeron; ms = metepisternum; p = peritreme; s = metathoracic spiracle.



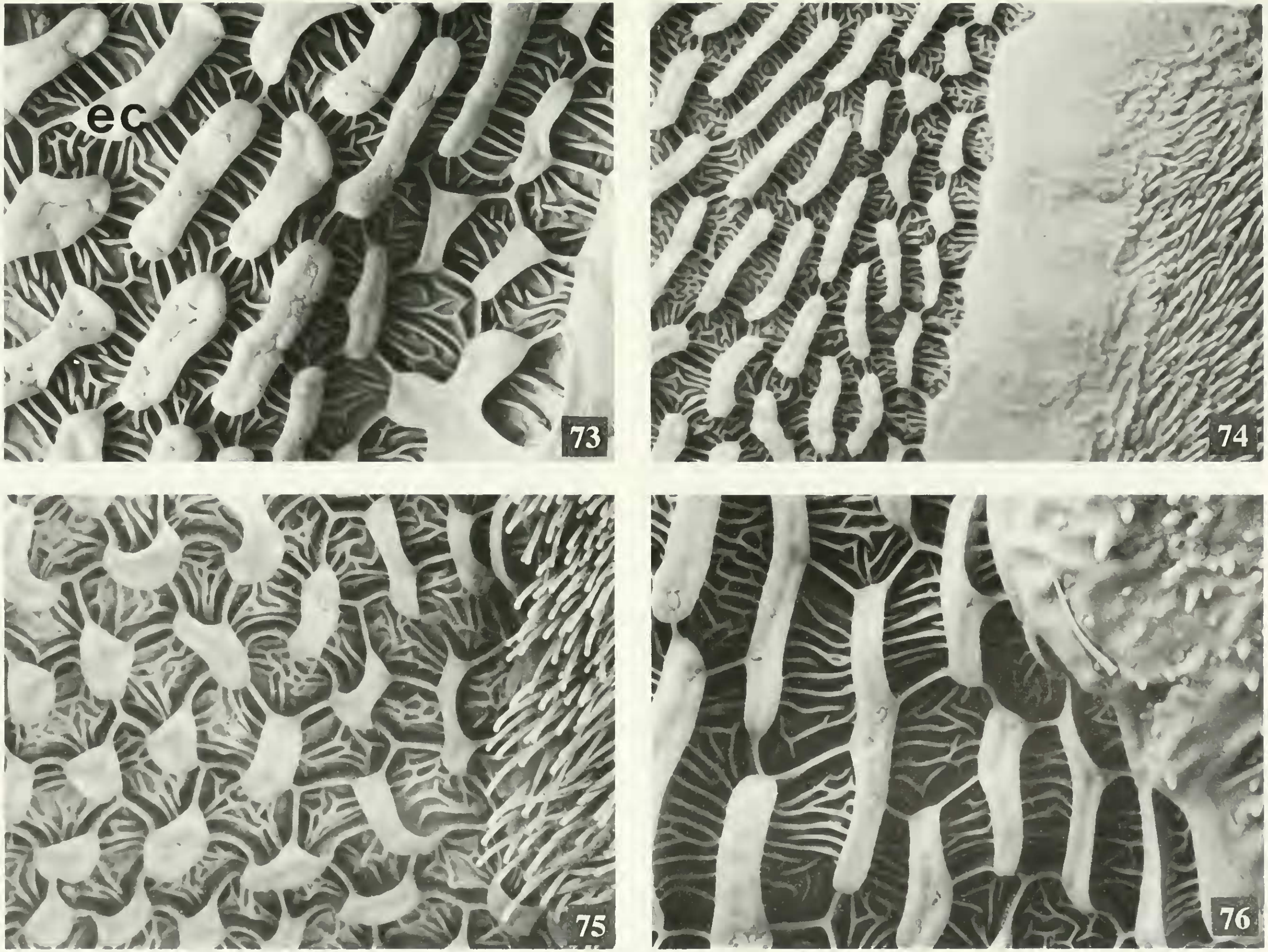
Figs. 61–64. Pterothoracic pleura. 61, *Arygrotelaenus elegans*, female. 62, *Democoris lugens*, female. 63, *Termatophylella fulvoides*, male. 64, *Termatophyloides pilosulus*, male.



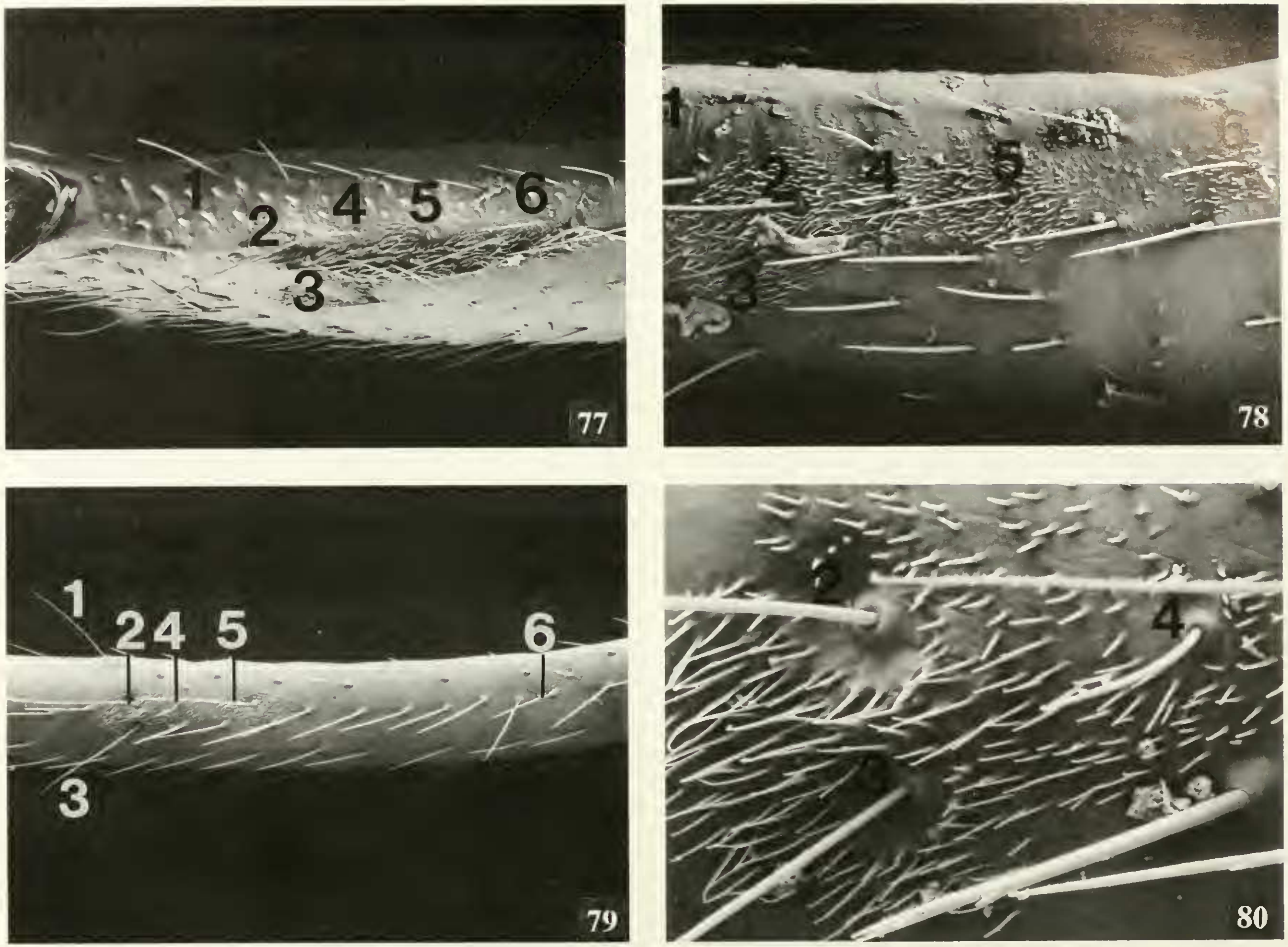
Figs. 65–68. Mesepimeron and metathoracic spiracle. 65, *Kundakimuka queenslandica,* male. 66, *Termatophylidea* sp., female. 67, *Termatophylina indiana,* female. 68, *Termatophylum melaleucae,* male. s = metathoracic spiracle.



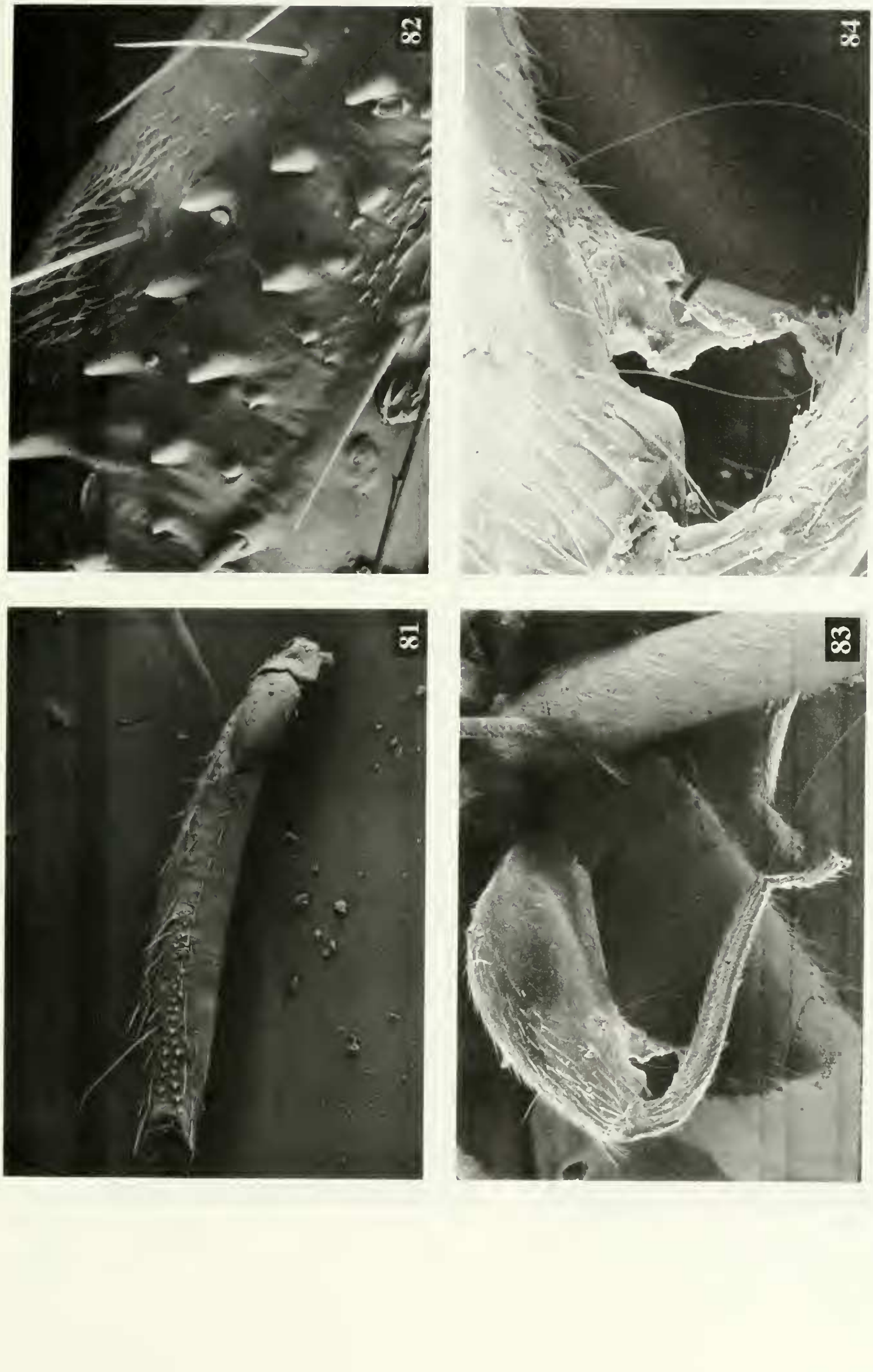
Figs. 69–72. Scent efferent system of metathoracic glands. 69, *Kundakimuka queenslandica,* male. 70, *Termatophylidea* sp., female. 71, *Termatophylina indiana,* female. 72, *Termatophylum melaleucae,* male. p = peritreme.



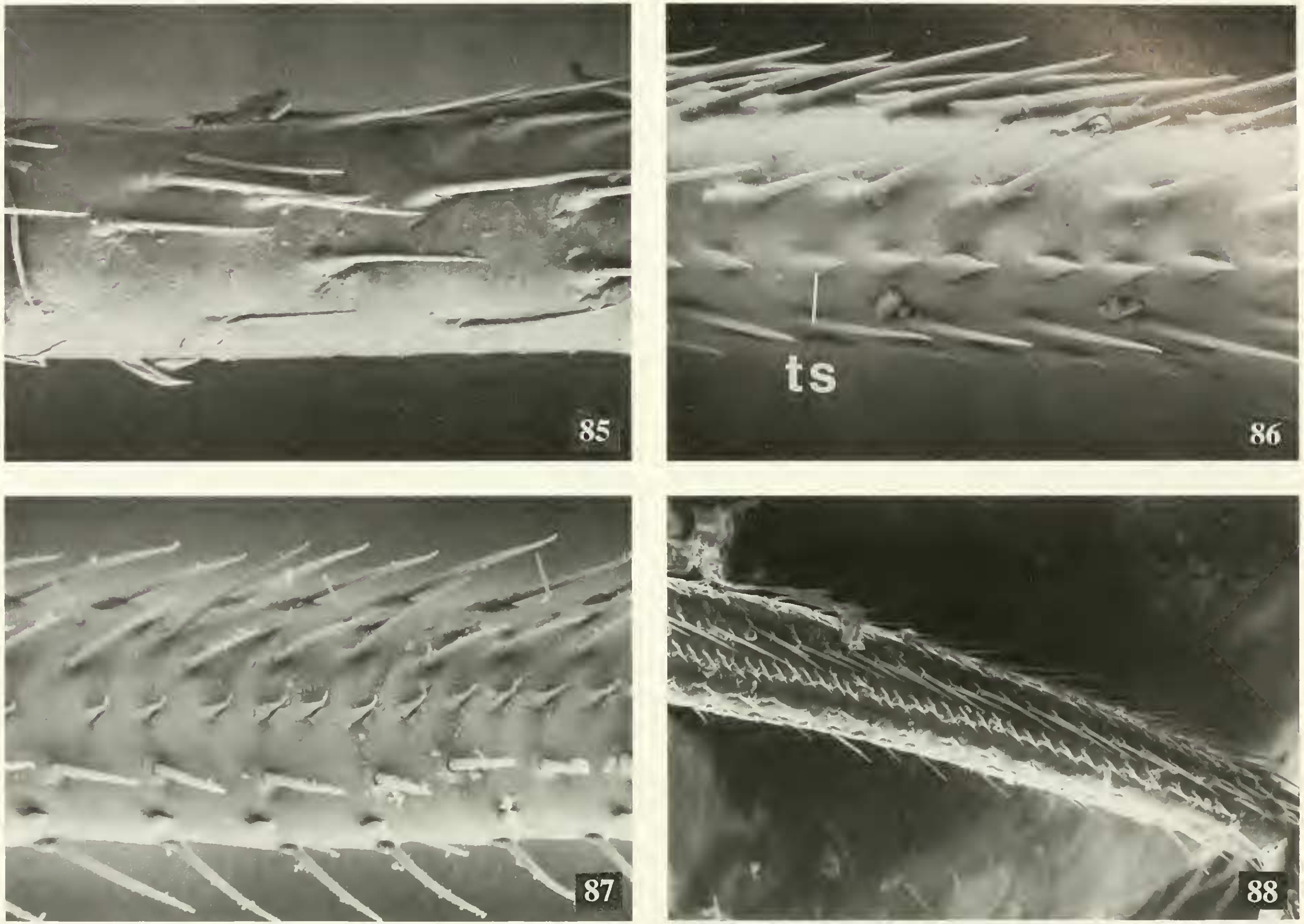
Figs. 73–76. Higher magnification of peritreme and scent efferent system. 73, *Kundakimuka queenslandica,* male. 74, *Termatophylidea* sp., female. 75, *Termatophylina indiana,* female. 76, *Termatophylum melaleucae,* male. ec = evaporative caps.



Figs. 77–80. Metathoracic trichobothria. 77, *Kundakimuka queenslandica,* male. 78, *Termatophylum insigne,* male. 79, 80, *Termatophylidea* sp., female; numbers refer to position of trichobothria.



Figs. 81–84. Spines on metafemora of *Kundakimuka* species. 81, *Kundakimuka carvalhoi*, male. 82, *Kundakimuka carvalhoi*, male, higher magnification of spine. 83, *Kundakimuka queenslandica*, male. 84, *Kundakimuka queenslandica*, higher magnification of rows of spines.



Figs. 85–88. Spinature of tibiae. 85, *Arygrotelaenus elegans,* female. 86, *Termatophylidea* sp., female. 87, *Kundakimuka queenslandica,* male. 88, *Kundakimuka carvalhoi,* male. ts = tibial spine.

constricta Maldonado, 1970 — Venezuela
hyalina Maldonado, 1970 — Venezuela
maculata Usinger, 1935 — Caribbean, Central America
ocellata Carvalho, 1955 — Costa Rica
opaca Carvalho, 1955 — Guyana, Surinam
pilosa Reuter and Poppius, 1912 — Caribbean, Central America

Termatophylina Carvalho, 1988
indiana Carvalho, 1988 — India

Termatophyloides Carvalho, 1955
pilosulus Carvalho, 1955 — Guatemala

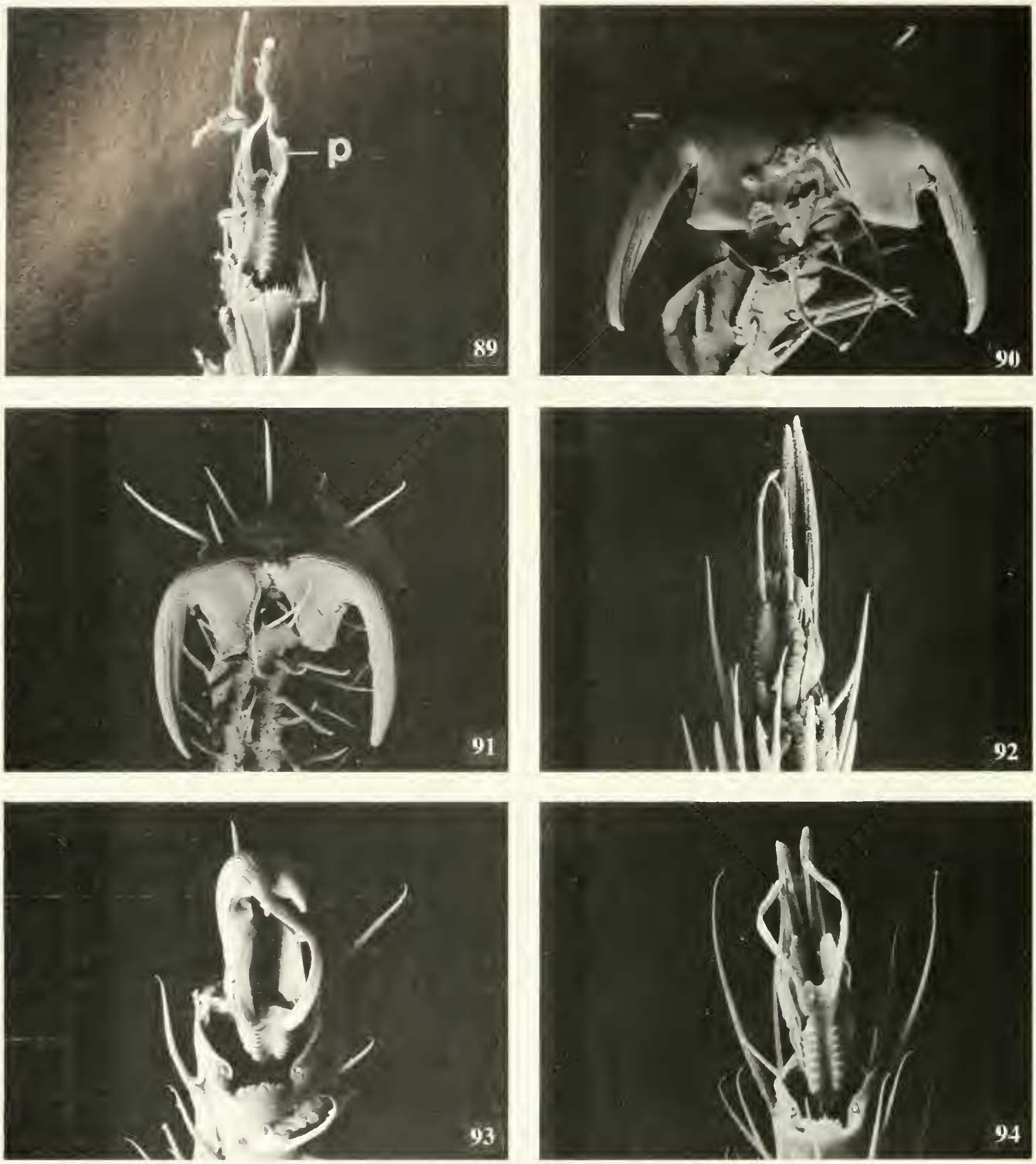
Termatophylum Reuter, 1884
grande Reuter and Poppius, 1912 — India
hikosanum Miyamoto, 1965 — Japan
insigne Reuter, 1884 — Middle East, Sudan
melaleucae Cassis n. sp. — Australia
montanum Carvalho, 1983 — Brazil
nigrum Poppius, 1910 — Kenya
obscurum Reuter and Poppius, 1912 — Sri Lanka, Indonesia
ochraceum Reuter and Poppius, 1912 — India
orientale Poppius, 1915 — Taiwan
rhea Linnavuori, 1974 — Nigeria
turneri China — South Africa
weiri Cassis n. sp. — Australia
yunnanum Ren, 1983 — China

KEY TO GENERA

1. Dorsum without rows of punctures on pronotum (Fig. 32) and hemelytra (Fig. 48) .... *Termatophylidea* (Neotropical region)
– Dorsum with punctures on pronotum (Fig. 31), and R+M and anal vein (Fig. 47) 2
2. Body with rows of flattened scalelike setae on pronotum and hemelytra .... *Argyrotelaenus* (Middle East, Sudan)
– Body without rows of flattened scalelike setae on pronotum and hemelytra, with setiform hairs only, rarely intermixed with scattered, flattened, scalelike setae 3
3. Eyes removed from collar by more than width of second antennal segment .... *Termatophylina* (India)
– Eyes contiguous with collar or removed by less than width of second antennal segment 4
5. Punctate R+M vein shorter than medial flexion line (Fig. 51) 6
– Punctate R+M vein longer than medial flexion line (Fig. 47) 7
6. Posterior margin of pronotal collar punctate (Figs. 31, 35); males with swollen, fusiform second antennal segment (Fig. 30) .... *Termatophylum* (Eastern Hemisphere, Brazil)
– Posterior margin of pronotal collar not punctate (Figs. 32, 36); males with cylindrical second antennal segment, weakly incrassate apically (Fig. 27) .... *Termatophyloides* (Guatemala)
7. Bucculae extremely broad and explanate, laterally almost reaching antennifers (Fig. 25) .. .. *Termatophylella* (Mexico)
– Bucculae moderately broad with margins weakly arcuate (Fig. 19) 8
8. Body ovoid, extremely broad (Fig. 1), with embolium wider than interocular distance; pronotum extremely tumid; metafemora not swollen .... *Democoris* (Australia)
– Body elongate to elongate-ovoid (Fig. 2), embolium not wider than interocular distance; pronotal disc obliquely raised above callosite region in lateral view (Fig. 43); metafemora greatly swollen (Fig. 83) .... *Kundakimuka* (Australia, Papua New Guinea, Japan, India, Hawaii)

KEY TO AUSTRALIAN SPECIES OF TERMATOPHYLINI

1. Body ovoid, extremely broad (Fig. 1); pronotum tumid 2
– Body elongate to elongate-ovoid (Fig. 2); pronotum not tumid 3



Figs. 89–94. Ventral view of pretarsus. 89, *Arygrotelaenus simoni*, male. 90, *Kundakimuka queenslandica*, male. 91, *Termatophylidea* sp., female. 92, *Termatophylina indiana*, female. 93, *Termatophylum insigne*, male. 94, *Termatophylum melaleucae*, male. p = parempodia.

2. Clypeus reddish; dorsum with elongate semierect setae .... *Democoris lugens*
– Clypeus dark brown; dorsum with short semiadpressed setae .... *Democoris leptocytus*
3. R+M vein longer than medial flexion line (Fig. 47) 4
– R+M vein shorter than medial flexion line (Fig. 51). 5
4. Metafemora with a large ventro-subdistal spine (Figs. 83, 84) .... *Kundakimuka carvalhoi*
– Metafemora with rows of short, black spines (Figs. 81, 82) ...... *Kundakimuka queenslandica*

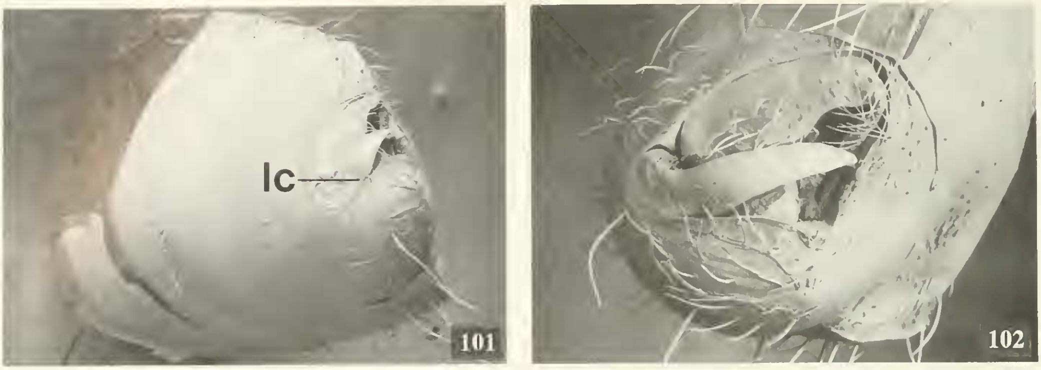
Figs. 95–100. Lateral view of pretarsus. 95, *Arygrotelaenus simoni*, male. 96, *Kundakimuka queenslandica*, male. 97, *Termatophylidea* sp., female. 98, *Termatophylina indiana*, female. 99, *Termatophylum insigne*, male. 100, *Termatophylum melaleucae*, male.

5. Hemelytral membrane yellowish, concolorous; apex of left paramere pointed (Fig. 110) .... *Termatophylum weiri*
– Hemelytral membrane patterned, mostly dark brown; apex of left paramere spatulate (Fig. 109) .... *Termatophylum melaleucae*

GENERIC AND SPECIES DESCRIPTIONS

Arygrotelaenus Reuter and Poppius

Arygrotelaenus Reuter and Poppius 1912: 14; Carvalho 1952: 50 (list), Carvalho



Figs. 101–102. Pygophore of *Kundakimuka queenslandica,* male. 101, lateral view. 102, dorso-caudal view. lc = left clasper.

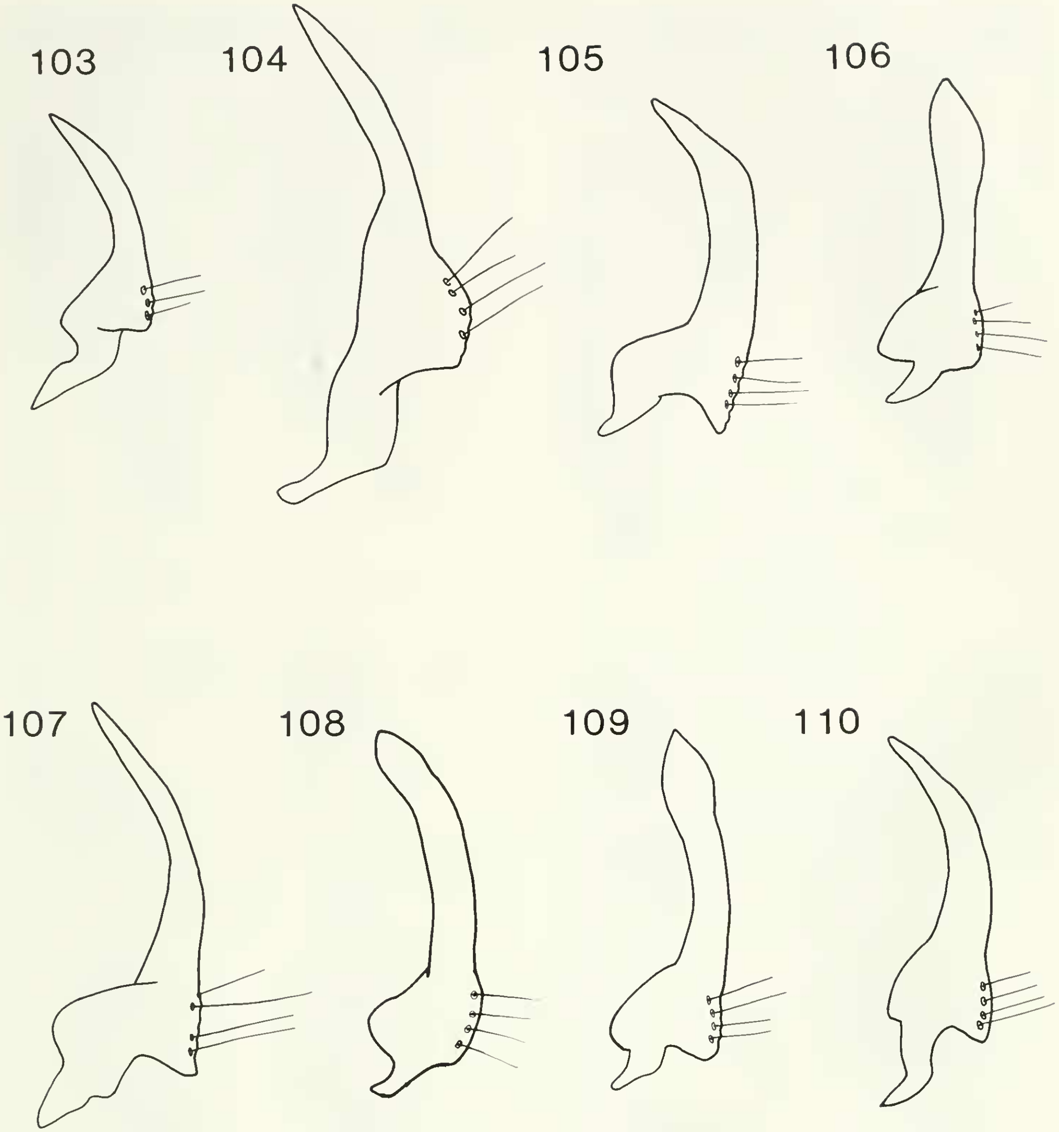
1955a: 22 (key), Carvalho 1957: 35 (catalogue), Stichel 1956: 176 (description).

Figures.—7, 15, 23, 39, 51, 61, 85, 89, 95, 103, 111.

Type species.—*Arygrotelaenus elegans* Reuter and Poppius, 1912, by original designation.

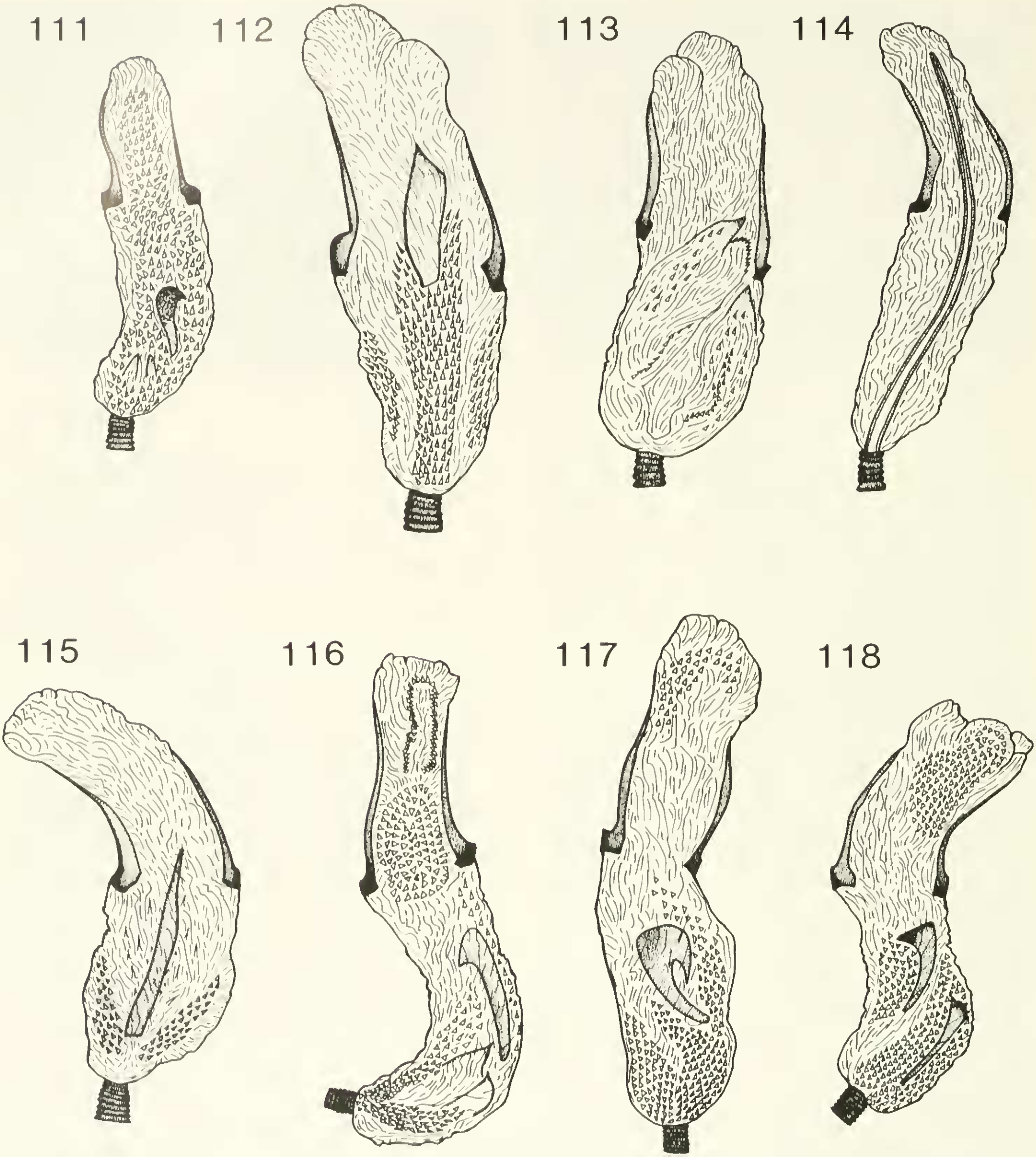
Diagnosis.—*Arygrotelaenus* is recognized by the flattened scalelike setae on the head and pronotum. It is most similar to *Termatophylum,* with the male second antennal segment swollen and fusiform in both genera. The vestiture of the male second antennal segment is also similar, with setiform, semierect setae, intermixed with flattened, scalelike setae. The antennae of the females differs in the two genera, with the first antennal segment greatly thickened in *Arygrotelaenus* species. Unlike *Termatophylum* (Fig. 31), the posterior margin of the pronotal collar and callosite region are not punctate in *Arygrotelaenus* (Fig. 39).

Description.—Parallel-sided; coriaceous; rows of punctures on anal and R+M veins (Fig. 51); longitudinal rows of silvery, flattened scalelike setae on head, pronotum, hemelytra and thoracic pleura, intermixed with very sparse distribution of setiform vestiture. *Head:* strongly porrect (Fig. 15), elongate (Fig. 7); vertex and frons narrowly bilaterally compressed, with an indistinct row of flattened scalelike setae, lateral margins strongly declivent, almost vertical; posterior margin of head carinate; frons barely declivent; clypeus weakly declivent, terminating above antennifers (Fig. 15); lateral margins of bucculae weakly arcuate (Fig. 23); gula elongate, narrow, weakly concave, margins not carinate, with a dense matt of whitish microsetae (Fig. 23). *Eyes:* moderately sized, almost contiguous with pronotal collar, separated by a distance less than the width of the second antennal segment; ommatidia large, interocular setae absent. *Antennae:* short; AI greatly swollen in females, thicker than AII; AII weakly incrassate distally in females, subequal in width to AIII; AII fusiform and swollen in males, thicker than AI; AIII and AIV thin, short, subequal in length, combined length subequal to AII length. *Labium:* barely reaching apices of forecoxae; LII longest segment. *Pronotum:* (Fig. 39) lateral margins moderately divergent; with four longitudinal rows of flattened scalelike setae, on lateral margins, and either side of the midline; collar broad, extending to lateral margins of eyes, posterior margin delimited by a shallow, nonpunctate groove; callosite region marked by a transverse and sublateral nonpunctate groove, with midline weakly to moderately, transversely rugose, calli not distinctly separated, pronotal antero-lateral setae absent; disc subequal in length to callosite region, strongly rounded, obliquely raised above



Figs. 103–110. Left clasper of male, lateral view. 103, *Arygrotelaenus simoni.* 104, *Democoris leptocytus.* 105, *Kundakimuka queenslandica.* 106, *Termatophylidea pilosa.* 107, *Termatophylina indiana.* 108, *Termatophylum insigne.* 109, *Termatophylum melaleucae.* 110, *Termatophylum weiri.*

callosite region, posterior margin truncate. *Scutellum:* weakly declivent, lateral margins not punctate. *Hemelytra:* (Fig. 51) narrow, barely extending beyond posterior angles of pronotum; lateral margins subparallel; anal vein punctate; embolium narrow, width less than length of pronotal collar; weakly punctate R+M vein short, barely surpassing mid-length of corium, medial flexion line longer than R+M vein, about ⅔'s length of corium, subparallel to R+M vein, and barely divergent posteriorly, region between veins marked by a row of flattened setae; cuneus longer than wide, lateral margins almost linear; membrane opaque, with color pattern, mesally brown and lat-



Figs. 111–118. Vesica, dorsal view. 111, *Arygrotelaenus simoni.* 112, *Democoris leptocytus.* 113, *Kundakimuka queenslandica.* 114, Termatophylidea pilosa. 115, *Termatophylina indiana.* 116, *Termatophylum insigne.* 117, *Termatophylum melaleucae.* 118, *Termatophylum weiri.*

erally pale; without microsetae; membrane cell subquadrate, broad; membrane vein indistinct, without subcaudal swelling. *Thoracic pleura:* (Fig. 61) tergopleural suture distinct above propleural suture, sometimes marked by a row of flattened scalelike setae; proepisternum subtriangular; proepimeron without pits; mesepimeron short, subquadrate, dorsal margin strongly arcuate, dorsocaudal arm with an oval spiracular opening, with evaporative area, ventral margin marked by a depression and a row of flattened scalelike setae, submesally with a row of flattened scalelike setae; metepisternum scent efferent system occupying half of segment; peritreme mesally placed, tonguelike, parallel-sided, not raised above plane of evaporative areas, evaporative bodies mostly subquadrate, remainder of metepisternum with numerous flattened scalelike setae. *Legs:* moderately long; coxae of moderate length; femora fusiform; femoral trichobothria not distinct in available specimens; tibiae cylindrical, without rows of spinelets, with moderate distribution of stiff, semi-adpressed setae; parempodia flattened, ribbonlike (Figs. 89, 95); *Abdomen:* broad, anthocoridlike, venter semipolished. *Male genitalia:* genital capsule minute, conical; left paramere (Fig. 103) very small, sensory lobe minute, with a few sensory hairs, shaft evenly arcuate, tapered apically; vesica (Fig. 111) with membranous lobe, gonoporal cavity present, basally with a pair of weakly sclerotized lobal sclerites, apex of membranous lobe with fields of spines.

Distribution.—Egypt, Yemen, Sudan, Israel, Saudia Arabia, Iraq.

Remarks.—*Arygrotelaenus* contains two very similar species confined to the Middle East and the Sudan. The genus was described by Reuter and Poppius (1912) for the Egyptian species, *A. elegans.* They erroneously indicated that the membrane cell is obsolete, and although it is greatly reduced in both *Arygrotelaenus* species, the membrane vein is visible. *Arygrotelaenus* species are the most colorful of the termatophylines, and are mostly dark with highly contrasting pale markings on the scutellum and hemelytra. Aside from Stichel's (1956) redescription of the genus and species, little else has been published on these taxa. Linnavuori (1975, 1980, 1989) noted their presence throughout the Middle East and indicated that *A. simoni* is found in association with *Acacia* species.

Arygrotelaenus is the sister taxon of *Termatophylum,* and is separated from it by the presence of rows of flattened scalelike setae on the head and pronotum. Some species of *Termatophylum,* such as *T. insigne,* have setae of this type, but they are scattered, and never produced into rows. The head structure is also different, with the head of *Arygrotelaenus* species elongate and strongly porrect, whereas the head in *Termatophylum* species is mostly transverse and less porrect. The vertex and frons in *Arygrotelaenus* are narrowly bilaterally compressed, and raised dorsally above the eyes, which occurs to a lesser extent in *Termatophylum turneri. Arygrotelaenus* is also differentiated from *Termatophylum,* by the smaller eyes, the lack of interocular setae, and the absence of punctations on the posterior margins of the collar and callosite region, and along the midline of the callosite region.

Arygrotelaenus elegans Reuter and Poppius

Arygrotelaenus elegans Reuter and Poppius 1912: 14, Linnavuori 1951: 104 (description), Carvalho 1952: 50 (type species), Carvalho 1957: 35 (catalogue), Wagner 1963: 484 (description), Linnavuori 1975: 6 (Sudan), Linnavuori 1980: 15 (Sudan; biogeography).

Figures.—7, 15, 23, 39, 51, 61, 85.

Syntypes.—UZMH. Type locality: Deschena, Egypt. Not examined.

Specimens examined.—Egypt, 1912–24, H12 (NHM; 2 females).

Diagnosis.—This species is very similar to *Arygrotelaenus simoni,* but can be differentiated from it by minor color differences in the hemelytra, and the relative length of the second antennal segment, which is a little longer than the first antennal segment in *A. elegans,* and shorter in *A. simoni.*

Description.—Female. Small, length 2.17–2.23, width 1.13–1.24, mostly dark brown, with yellow markings on hemelytra, and scutellum mostly yellow. *Head:* length 0.45–0.48, width 0.33–0.34, interocular distance 0.14–0.15, dark brown. *Eyes:* black tinged with red. *Labium:* length 0.80, reaching apex of forecoxae, yellow, reaching apices of forecoxae; LII longest segment, reaching posterior margin of head; LIII reaching middle of forecoxae. *Antennae:* length 0.24, dark brown; AII length 0.25–0.27, basally dark brown, remainder yellow; AIII length 0.14–0.18, yellow; AIV length 0.14–0.16, yellow. *Pronotum:* length 0.47, posterior width 0.66–0.70. *Scutellum:* anterior half brown, remainder yellow. *Hemelytra:* clavus dark brown; corium with anterior half yellow, remainder dark brown; length of R+M vein half of corial length; medial flexion line almost reaching cuneal fracture; cuneus dark brown; membrane opaque, mesal brown band, laterally whitish. *Legs:* uniformly yellow.

Males not available.

Remarks.—Reuter and Poppius' (1912) original description adequately separated this species from *A. simoni,* primarily on the basis of color differences. Linnavuori (1951) redescribed the species without figuring the male genitalia. Stichel (1956) and Wagner (1963) gave detailed descriptions of the external characters of this species. Linnavuori (1975) listed the species from Egypt. Linnavuori (1980) listed *A. elegans* from the desert zone of the Saharan region.

The coloration, size and shape of the two *Arygrotelaenus* species are similar and further study is needed to clearly differentiate the two *Arygrotelaenus* species. The minor differences in the antennal segment lengths needs to be confirmed with additional material. No males of *A. elegans* were available for this study and a comparison of the male genitalia of the two species is necessary to confirm the separation of these taxa.

Democoris Cassis n. gen.

Figures.—1, 8, 16, 24, 40, 52, 62, 104, 112.

Eytomology.—*demos* (Greek)—fat; *koris* (Greek)—bug.

Type species.—*Democoris lugens* Cassis n. sp.

Diagnosis.—This genus is recognized by the broad, ovoid body and the extremely tumid pronotum. Both species have a finger-like peritreme, with its apex weakly arcuate and raised above the plane of the evaporative areas.

Description.—Ovoid, extremely broad (Fig. 1); coriaceous, weakly rugo-punctate; with rows of punctures on pronotum (Fig. 40), scutellum, R+M and anal veins (Fig. 53); dorsum with dense distribution of moderate sized to elongate, semiadpressed or semierect, pale setae. *Head:* transverse (Fig. 8), moderately declivent (Fig. 16), posterior margin carinate; vertex weakly to strongly rounded; frons strongly narrowed in front; clypeus moderately declivent, barely reaching antennifers in lateral view; lateral margins of bucculae moderately arcuate (Fig. 24); gula moderately broad, weakly concave, with transverse ridges, margins not carinate, with a few elongate, semierect, pale setae. *Eyes:* very large; contiguous with pronotal collar (Fig. 16), covering most of the lateral aspect of the head; ommatidia large, with short or elongate, interocular setae. *Antennae:* short; with moderate cover of semiadpressed setae; AI not thickened; AII weakly incrassate distally; AIII cylindrical; AIV not present on available specimens. *Labium:* reaching apices of forecoxae; LII longest segment. *Pronotum:* (Fig. 40) lateral margins moderately to weakly divergent posteriorly; moderately to extremely tumid, not biconvex; collar narrow, at most reaching mid-width of eyes, posterior margin marked by a deep groove with a few separated deep punctures; callosite region marked by an arcuate, transverse and sublateral, punctate groove, without any midline groove, callosite region tumid; pronotal antero-lateral setae moderately elongate, anteriad to propleural suture; disc subequal in length to callosite region; declivent posteriorly, posterior margin truncate. *Mesonotum:* small, barely visible from above, strongly declivent. *Scutellum:* flattened with lateral margins marked by row of punctures. *Hemelytra:* (Fig. 52) extremely broad, extending beyond posterior angles of pronotum (Fig. 1); lateral margins strongly arcuate; anal vein punctate; embolium very broad, much wider than the length of the pronotal collar; R+M vein punctate, elongate, almost reaching cuneal fracture; medial flexion line shorter than R+M vein, about ⅔'s length of corium, weakly divergent from R+M vein; cuneus length subequal to width; membrane translucent, dusty, concolorous, without microsetae; membrane cell narrow to very narrow, vein indistinct, with a posterior, subcaudal, obscure thickening. *Thoracic pleura:* (Fig. 62) tergopleural suture indistinct, weakly depressed; propleural suture distinct; proepisternum subquadrate; proepimeron without pits; mesepimeron large, broad, subtrapezoidal, anterior half flattened, posterior half tumid, dorsal margin strongly angulate, dorso-caudal arm with an oval spiracular opening, with evaporative areas, ventral margin marked by a weak, arcuate depression; metepisternum scent efferent system occupying about half of segment, not contiguous with mesothoracic evaporative areas; peritreme mesally placed, narrow, fingerlike, with apex tapered, weakly arcuate, and raised above the plane of the evaporative areas, remainder of metepisternum with a few short, adpressed whitish setae. *Legs:* moderately long; coxae large, elongate; femora elongate, subcylindrical; four mesofemoral and six metafemoral trichobothria; tibiae cylindrical, without rows of spinelets, with stiff, semiadpressed setae; pretarsus with setiform parempodia. *Abdomen:* broad, anthocoridlike, venter polished. *Male genitalia:* genital capsule minute, conical; left paramere (Fig. 103) moderately large, sensory lobe weakly expanded, with a few sensory hairs, shaft evenly arcuate, tapered apically; vesica (Fig. 112) with membranous lobe, gonoporal cavity present, with large, mesal, sublinear lobal sclerite, tapered apically.

Distribution.—Australia.

Remarks.—*Democoris* is morphologically atypical in comparison with most termatophyline genera. It contains two species confined to the arid and dry mediterranean environs of South Australia. As yet nothing is known of the biology of the two included species. This genus is similar to the Middle American genus *Termatophylella,* but can be separated from it by differences of the bucculae and the peritreme. The bucculae in *Democoris* are moderately broad, with the margins arcuate, whereas in *Termatophylella,* the bucculae are greatly enlarged, with the margins, greatly enlarged, explanate, and laterally almost extending to the antennifers. The peritreme of *Democoris* is also distinct, being very narrow and fingerlike, with the apex strongly tapered, projected away from the body, and above the plane of the evaporative areas. In *Termatophylella* the peritreme is tonguelike, quite broad, with the posterior margin weakly raised along its length, as is typical of a number of other termatophyline genera. These differences support the present separation of the two genera. Dorsally these genera could be confused, both having an enlarged, somewhat tumid pronotum. All the species are broad, with the embolium particularly broad; however, the body length of *Termatophylella fulvoides* is significantly smaller than the two *Democoris* species. The rows of punctures on the pronotum, and anal and R+M veins are very similar in both genera. Generally in both genera the membrane cell is narrow, and this is particularly so for *T. fulvoides* and *D. leptocytus.*

Democoris is the sister taxon of the clade containing *Arygrotelaenus* and *Termatophylum* (Fig. 131), and is related to these taxa on the basis of the recessed metathoracic spiracle and the reduced scent efferent system. *Democoris* also has a close relationship with the genus *Kundakimuka,* although saliently the two genera are dissimilar. *Democoris* contains oval species, with the pronotum greatly tumid, whereas in *Kundakimuka* the body is elongate to elongate to elongate-ovoid. *Democoris* also differs from *Kundakimuka* by the following characters; the narrow membrane cell, the metathoracic spiracle recessed and not visible in lateral view, the evaporative areas of the mesepimeron and metepisternum not contiguous, the peritreme positioned on the midline of the scent efferent system, and the parempodia setiform and not expanded apically.

Democoris lugens Cassis n. sp.

Figures.—1, 8, 16, 24, 40, 52, 62.

Eytomology.—*lugens* (latin)—dark.

Holotype.—Female. Mitcham. S[outh] Aust[ralia], 17-i-1981, at light, R.V. Southcott (SAMA).

Other specimens examined.—Paratype: Female. South Australia: Barossa (SAMA).

Diagnosis.—*D. lugens* is distinguished from *D. leptocytus* by the extremely broad body, and the dense distribution of elongate semierect, whitish setae. The clypeus is reddish-orange, as opposed to the fuscous clypeus of *D. leptocytus.*

Description.—Female. Large, length 4.10–4.55, width 2.11–2.30, extremely broad, uniformly fuscous, with dense cover of long semierect, whitish setae. *Head:* length 0.49–0.58, width 0.72–0.73, interocular distance 0.28, vertex fuscous; frons strongly narrowed in front of antennifers, reddish-orange; clypeus reddish-orange; maxillary and mandibular plates reddish-orange. *Eyes:* black tinged with red, with elongate, erect, pale interocular setae. *Antennae:* AI short, length 0.22, yellow; AII weakly incrassate apically, length 0.53, mostly yellow, with bases and apices weakly embrowned; AIII shorter than AIV, length 0.28, yellow; AIV length 0.36, yellow. *Labium:* length 1.06, barely surpassing forecoxae; LII reaching midpoint of collar; LIII reaching beyond midpoint of forecoxae. *Pronotum:* strongly tumid, lateral margins moderately divergent; length 0.78–0.96, posterior width 1.67–1.82; pronotal antero-lateral setae elongate. *Mesonotum:* barely visible, fuscous. *Scutellum:* fuscous. *Hemelytra:* embolium extremely broad, almost as wide as interocular distance; membrane short, translucent, with obscure embrownment, with one small, narrow membrane cell (Fig. 52), width subequal to embolium width, vein with obscure fuscous markings. *Legs:* coxae brown with apices yellow; trochanters yellow; femora brown, with apices yellow, dorsal margins with short adpressed, pale setae, ventral margins with elongate, semierect, pale setae, with four mesofemoral trichobothria and six metafemoral trichobothria; tibiae yellowish, with dense distribution of strong, straight, semiadpressed, pale setae; tarsi yellowish.

Male unknown.

Remarks.—This species is the largest of all the known termatophylines, over 4 mm, and a quarter again the length of its congener. This spectacular species is only known from two female specimens from the Adelaide area and the Barossa Valley of South Australia. Its broad and tumid body is diagnostic for the genus, and the species is clearly distinguished by color characteristics and the vestiture of the dorsum.

Democoris leptocytus Cassis n. sp.

Figures.—104, 112.

Eytomology.—*lepto* (Greek)—narrow; *kyto* (Greek)—cell.

Holotype.—Male: South Australia: Mt Davies, 11 Nov[ember] 1963, at light, collectors P. Aitken and N. B. Tindale (SAMA).

Diagnosis.—*D. leptocytus* is readily identified by the very narrow membrane cell, and can be differentiated from its congener by other characters given in the diagnosis of *D. lugens.*

Description.—Male. Small, length 2.95, width 1.60, broad, uniformly fuscous, with dense cover of medium sized, semiadpressed, whitish setae. *Head:* length 0.42, width 0.64, interocular distance 0.25, vertex fuscous, with posterior margin yellow; frons fuscous; clypeus orange-brown; maxillary and mandibular plates orange-brown. *Eyes:* black with reddish tinge on inner margins, ommatidia large, with interocular setae small, barely surpassing maximum height of ommatidia. *Antennae:* AI length 0.22, yellow, with a few semiadpressed setae; AII length 0.33, weakly incrassate apically, mostly yellow, with an indistinct embrownment basally, with moderate cover of semiadpressed, pale setae; AIII length 0.21, yellowish-brown, with a moderate cover of semiadpressed, pale setae. *Labium:* mostly yellow, length 0.54, reaching apices of forecoxae; LII reaching proxyphus; LIII reaching midlength of forecoxae. *Pronotum:* moderately tumid, callosite region more so than disc, lateral margins weakly divergent, setae thickened along lateral margins; uniformly fuscous; length 0.61, posterior width 1.96; callosite region more so than disc; pronotal antero-lateral setae moderately sized; posterior margin strongly truncate. *Hemelytra:* clavus, embolium and cuneus mostly fuscous, apex of clavus with a small yellow marking, and an indistinct red marking above cuneal fracture, corium orange brown; membrane opaque, yellowish-brown, membrane cell very narrow, about as wide as the length of the pronotal collar, vein dark brown and indistinct. *Legs:* short; coxae dark, shiny brown; femora mostly dark brown with apices yellow; trichobothria not clear in type specimen; tibiae light yellowish-brown. *Male genitalia:* left paramere (Fig. 104); vesica (Fig. 112).

Female unknown.

Remarks.—The male genitalia of this species is very simple, and unlike other termatophylines, does not have large basal spicules. This species which is only known from one male specimen is not considered to be conspecific with *D. lugens,* known from two female specimens, because of its larger size, more tumid shape of the latter species, and the different vestiture. The two species are restricted to South Australia, with *D. leptocytus* confined to the arid northwest corner of the state, and *D. lugens* found in the Mediterranean zone of South Australia.

Kundakimuka Cassis n. gen.

Figures.—2, 3, 11, 19, 27, 31, 35, 43, 47, 57, 65, 69, 73, 77, 81, 82, 83, 84, 87, 88, 90, 96, 101, 102, 105, 113.

Eytomology.—*kunda* (Larrickia)—big, *kimuka* (Larrickia)—leg. Derived from the Larrickia aboriginal language, which is the predominate language group of the tropical parts of the Northern Territory.

Type species.—*Kundakimuka carvalhoi* Cassis n. sp.

Diagnosis.—*Kundakimuka* is characterized by the flattened pronotum (Fig. 31), the setiform parempodia which are weakly flattened apically (Figs. 90, 96), and the enlarged metafemora, which have either a large subapical spine (Figs. 81, 82), or small bristlelike spinelets (Figs. 83, 84) on the ventral surface. This genus is somewhat similar to *Termatophylum,* however, the punctate R+M is shorter than the medial flexion line vein in the latter (Fig. 56), and longer in *Kundakimuka* (Fig. 47).

Description.—Elongate to elongate-ovoid (Fig. 2), moderately dorso-ventrally flattened, with rows of punctures on pronotum, and anal and R+M veins, moderate cover of long semierect, pale setae. *Head:* transverse (Fig. 3), weakly porrect (Fig. 11); vertex rounded; frons moderately declivent; clypeus strongly narrowed in front, strongly declivent, barely reaching antennifers; bucculae margins moderately arcuate (Fig. 19); gula moderately broad, weakly concave, weakly transversely rugose. *Eyes:* very large, covering most of lateral aspect of head, contiguous with pronotal collar (Fig. 11); ommatidia large, with elongate, interocular setae. *Antennae:* short; AI fusiform, not swollen; AII weakly incrassate apically (Fig. 27); AIII and AIV slender, narrower than preceding segments. *Labium:* reaching between the foretrochanters and midpoint of mesosternum; LII longest segment. *Pronotum:* (Fig. 31) broad, strongly flattened; lateral margins moderately divergent posteriorly; collar narrow, extending to mid-width of eyes, posterior margin delimited by deep, nonpunctate groove; callosite region marked by a transverse and sublateral sinuate, punctate groove (Fig. 36), indistinct near posterior margin of pronotal collar, with a short punctate groove along midline from posterior margin, pronotal antero-lateral setae elongate, anteriad to propleural suture; disc region flattened, subequal in length to callosite region, posterior margin weakly bisinuate. *Mesosternum:* short, visible from above, flattened. *Scutellum:* flattened, lateral margins with a short row of deep punctures. *Hemelytra:* (Fig. 47) moderately broad, just wider than posterior angles of the pronotum (Fig. 2); anal vein punctate; embolium moderately broad, wider than length of pronotal collar; R+M vein punctate, elongate, almost reaching cuneal fracture; medial flexion line elongate, just short of R+M vein, weakly divergent posteriorly; cuneus as long as wide; membrane translucent, embrowned, concolorous; membrane cell subquadrate, broad; membrane vein with a subcaudal thickening. *Thoracic pleura:* (Fig. 57) tergopelural suture anteriorly distinctly grooved, posteriorly weakly depressed (Fig. 43); proepisternum subquadrate; propleural suture distinct; proepimeron without pits; mesepimeron narrow, V-shaped, dorsal margin strongly angulate, dorso-caudal arm with a lanceolate spiracular opening (Fig. 65), with evaporative area, ventral margin marked by a weak depression, and a few elongate, semierect setae; metepisternum scent efferent system large (Fig. 69), occupying about half of the segment, contiguous with metathoracic evaporative areas; peritreme (Fig. 73) placed just caudad of midline of scent efferent system, weakly dorso-caudally projected, broad, tonguelike, with either apex tumid and raised above plane of evaporative areas, or apex tapered and posterior margin weakly raised above evaporative areas, either ending before or sometimes just dorsally beyond evaporative areas; remainder of metepisternum short, depressed, with a few semierect, pale setae; metepimeron raised, narrow. *Legs:* moderately long; coxae broad, moderately long, weakly separated; metatrochanters sometimes with short spine subdistally (Fig. 83); femora fusiform, with metafemora greatly enlarged each with large subdistal ventral spine (Figs. 83, 84), or moderately enlarged with rows of recumbent, bristlelike spines (Figs. 81, 82), four mesofemoral and six metafemoral trichobothria (Fig. 77); tibiae cylindrical to weakly arcuate, with four rows of minute spinelets (Figs. 87, 88), intermixed with semierect stiff setae; parempodia weakly flattened and expanded apically; pretarsus (Figs. 90, 96) with claws strongly cleft basally, parempodia setiform, and apically flattened; *Abdomen:* broad, anthocoridlike, venter, semipolished. *Male genitalia:* genital capsule small, with tergite X partially fused to the dorsal margin of the genital opening; left paramere (Fig. 105) small with a very small sensory lobe, and a narrow straplike shaft, evenly arcuate, and tapered apically; vesica (Fig. 113) with membranous lobe, with weakly spiculate gonoporal cavity, with broad ill-defined lobal sclerite.

Distribution.—Australia, Papua New Guinea, Japan, India, Hawaii.

Remarks.—*Kundakimuka* is a distinct genus found in the eastern Indo-Pacific, where new species require description, and one species, closely allied to *K. queenslandica,* has broadly spread. The Japanese species *K. pallipes* has been transferred to *Kundakimuka* from *Termatophyloides* on the basis of the head structure (see Remarks section of *Termatophyloides* for discussion). The two Australian species described below are the only species critically evaluated in this work. *Kundakimuka* is externally similar to *Termatophylum,* but can be distinguished from it by numerous characters, including differences in the length of the R+M vein, the shape of the second antennal segment, the punctation of the pronotum, characters of the pterothoracic pleura, metafemora, pretarsi, and male vesica. The male second antennal segment in *Kundakimuka* is weakly incrassate apically, but is always fusiform and swollen in *Termatophylum* species. The metathoracic spiracle in *Kundakimuka* is exposed, and the associated evaporative areas are contiguous with those of the scent efferent system of the metepisternum. In *Termatophylum* species the spiracle is recessed, with the opening not visible, and the evaporative areas are not contiguous with those of the metepisternum. The pretarsi of the two genera show some similarity, with the parempodia flattened in *Termatophylum*, and only apically flattened in *Kundakimuka*. The lobal sclerites of the two genera are markedly different; in *Kundakimuka* they are obscure, and in *Termatophylum* they are sickle-shaped.

Kundakimuka carvalhoi **Cassis n. sp.**

Figures.—2, 83, 84, 88.

Eytomology.—This species is named after José Carvalho, in honor of his contributions to world miridology.

Holotype.—Male. Smith Point, N[orthern] T[erritory], 3-viii-1982, C. Wilson and S. Collins, ex light trap, registration no. 8592 (NTMAG).

Diagnosis.—This species can be separated from all other termatophylines by the greatly expanded metafemora, each with a large, ventro-subdistal triangular spine (Figs. 83, 84) and the short subdistal spine on each of the metatrochanters (Fig. 83).

Description.—Male. Small, length 2.40, width 1.01, strongly dorso-ventrally flattened; uniformly yellowish-brown, smooth, with moderate cover of long semierect, golden setae. *Head:* length 0.29, width 0.46, interocular distance 0.19. *Eyes:* black with reddish tinge. *Antennae:* uniformly yellowish; AI weakly fusiform, length 0.13, less than interocular distance, with a few semierect setae; AII, length 0.33, with semiadpressed golden setae; AIII, length 0.20, cylindrical, with adpressed, short setae, and semierect setae; AIV, length 0.13, weakly fusiform, setation as AIII. *Labium:* length 0.84, reaching midpoint of mesosternum; LII and LIII subequal in length, LII reaching proxyphus, LII reaching proxyphus, LIII reaching apices of forecoxae. *Pronotum:* strongly flattened, length 0.43, posterior width 0.82, with uniform distribution of semierect setae; antero-lateral pronotal setae elongate, inserted dorsad of tergopleural suture and anteriad of propleural sulcus. *Thoracic pleura:* peritreme dorsally tumid, raised above and extending just dorsally beyond evaporative areas. *Scutellum:* yellowish-brown, lighter posteriorly, lateral margins without punctures. *Hemelytra:* uniformly yellowish brown, with R+M and anal veins fuscous, membrane faintly embrowned. *Legs:* metatrochanters each with a short, subdistal spine (Fig. 83); fore and mesofemora fusiform, not expanded; metafemora, greatly expanded, about 2.5 × wider than preceding femora, with a very large, ventral, triangular spine (Figs. 83, 84), apex of metafemora expanded into a cuplike opening; with four mesofemoral and six metafemoral trichobothria; tibiae weakly arcuate, dorsal face with lateral row of closely pressed sclerotized teeth (Fig. 88), ventral face with row of scattered sclerotized teeth, foretibiae with well-developed ventral tibial comb; pretarsal claws with strong basal teeth, and weakly flattened setiform parempodia, each weakly expanded at apex. *Male genitalia:* genital capsule minute, conical; left paramere small, weakly arcuate.

Female unknown.

Distribution.—Northern Territory (known only from type locality).

Remarks.—*Kundakimuka carvalhoi* differs from *K. queenslandica* in color, with the former having a concolorous, pale yellowish-brown color, and the latter species being dark brown with lighter markings on the dorsum. The peritreme of the two species also differs with the type species having the apex weakly tumid and raised, and extending beyond the dorsal margin of the evaporative areas, whereas in *K. queenslandica* the peritreme is only weakly raised along its posterior margin, and terminates ventrad of the dorsal margin of the evaporative areas. The peritremes are similar in placement; just posteriad of the midwidth of the scent efferent system, and dorso-caudally directed. The metafemora in the two Australian *Kundakimuka* species are enlarged, but particularly so in *K. carvalhoi*, with each having an enlarged, subdistal spine.

Kundakimuka queenslandica **Cassis n. sp.**

Figures.—3, 11, 19, 27, 31, 35, 43, 47, 57, 65, 69, 81, 82, 87, 90, 96, 101, 102, 105, 113.

Eytomology.—The species name refers to the State of Queensland distribution.

Holotype.—Male. Maryborough, Queensland, 18-IV-1973, D.A.I. N3700 13277, C.I.E. coll[ection] A.6716 13277 (QDPI).

Other specimens examined.—Paratypes: QLD: Maryborough, 18-IV-1973, D.A.I., N3700, suspected predator of *Neodrepta luteodactella* (Lepidoptera) larva on *Melaleuca integrifolia* (Myrtaceae) (NHM: 3 males, 2 females; QDPI: 1 male, 1 female); QLD: Gympie, Lagoon Pkt, 4-VII-1968, D.A.I., numerous preying on larvae of *Neodrepta luteodactella* on *Melaleuca integrifolia* foliage, N3106 (NHM: 2 males, 2 females); QLD: Bauple, (CSR), 1-VII-1974, with *Neodrepta luteodactella* on *Melaleuca integrifolia,* N3852 (QDPI: 2 females, 1 male).

Diagnosis.—Distinguished from other *Kundakimuka* species by the presence of small spines on the ventral surface of the meso- and metafemora.

Description.—Male. Small, length 2.33–2.82, width 0.98–1.36, moderately dorso-ventrally flattened, mostly dark brown, with a few yellowish-orange markings on the dorsum, and a moderate cover of long, semi-erect, golden setae. *Head:* length 0.34–0.46, width 0.49–0.53, interocular distance 0.23–0.24, mostly brown with clypeus, maxillary and mandibular plates yellowish brown. *Eyes:* mostly reddish with fuscous tinge. *Antennae:* AI length 0.14–0.16, proximal half yellowish-brown, distal half yellow, AII length 0.34–0.37, weakly incrassate apically, yellow; AIII length 0.22–0.24, yellow; AIV length 0.22–0.24, brown. *Labium:* length 0.88–1.20, reaching between apices of forecoxae and foretrochanters. *Pronotum:* moderately flattened, length 0.48–0.54, posterior width 0.82–0.96, mostly brown, with a yellowish marking on midline of pronotal disc. *Thoracic pleura:* peritreme short of dorsal margin of evaporative areas, polished orange dark brown, slightly raised above evaporative areas. *Mesonotum:* brown with distinct reddish markings on each side of midline. *Scutellum:* brown laterally, with an indistinct reddish-yellow to yellowish marking along posterior half of midline. *Hemelytra:* mostly brown, lighter brown to yellowish-brown on anterior parts of corium, embolium, and cuneal fracture, membrane mostly dusty brown, sometimes mesally pale and translucent. *Legs:* forefemora mostly yellow, sometimes with a dorso-proximal infuscation; mesofemora and metafemora fuscous with apices yellow, ventral margins with indistinct rows of very short, recurved, black spines (Figs. 81, 82), metafemora moderately incrassate, four mesofemoral and six metafemoral trichobothria; tibiae cylindrical with four rows of minute, closely pressed sclerotized, fuscous teeth (Fig. 87); pretarsal claws (Figs. 90, 96) strongly cleft basally, with setiform parempodia, apically flattened (Fig. 90). *Genitalia:* tergite X as a U-shaped process, connate apically with dorsal margin of genital opening; left paramere (Fig. 105); vesica (Fig. 113).

Female. Similar to male in structure and color. Length 2.79–3.04, width 1.30–1.39. *Head:* length 0.36–0.37, width 0.54–0.60, interocular distance 0.54–0.60. *Antennae:* AI length 0.14–0.16, AII length 0.36–0.38, AIII length 0.23–0.24, AIV length 0.22–0.23. *Labium:* length 0.98–1.02. *Pronotum:* length 0.58–0.60, posterior width 1.06.

Remarks.—*K. queenslandica* is somewhat similar to *Termatophylum* species in color and texture, and in coastal Queensland where these species are sympatric, differentiating the two genera requires careful examination. In such cases the relative lengths of the R+M vein and medial flexion line veins easily distinguishes the two genera, with *Termatophylum* species having a short R+M vein.

Specimens of *Kundakimuka* from India, Papua New Guinea and Hawaii have been received from the Natural History Museum which are very similar to *K. queenslandica.* They possess spiculate ventral surfaces of the meso- and metafemora. Adam Asquith (personal communication) has indicated that the termatophyline found in Hawaii is a recent introduction. It is possible that the specimens from India and New Guinea could also be introductions, and that this species may be adventitious in other areas of the Indo-Pacific. At present these specimens are not considered to be conspecific with *K. queenslandica.*

All specimens of *Kundakimuka queenslandica* have been recorded from *Melaleuca integrifolia* (Myrtaceae), which also harbors *Termatophylum weiri.* The label data on these specimens indicates that *K. queenslandica* feeds on the lepidopterous larvae of *Neodrepta luteotactella.*

Termatophylella Carvalho

Termatophylella Carvalho 1955b: 643; Carvalho 1955a: 22 (key), Carvalho 1957: 35 (catalogue)

Figures.—9, 17, 25, 41, 53, 63.

Type species.—*Termatophylella fulvoides* Carvalho 1955, by original designation.

Diagnosis.—*Termatophylella* is recognized by the greatly enlarged bucculae (Fig. 9), with the lateral margins explanate, and almost reaching the antennifers when viewed ventrally.

Description.—Ovoid, with rows of punctures on transverse groove of pronotum, anal and R+M veins; sparse cover of short, semiadpressed setae. *Head:* transverse (Fig. 9), strongly porrect (Fig. 17); vertex strongly convex; frons declivent, rounded, wide; clypeus short, weakly declivent, terminating above antennifers; bucculae greatly enlarged, and widely separated, explanate, and almost contiguous with antennifers (Fig. 25), longer than first labial segment; gula elongate, narrow, weakly convex, lateral margins carinate, with transverse ridges, with a row of soft, moderately long, semierect setae. *Eyes:* large, almost contiguous with pronotal collar, distance less than the width of the second antennal segment; ommatidia large, with short, interocular setae. *Antennae:* short; AI fusiform, not swollen; AII weakly incrassate distally; AIII subequal in length to AII, longer than AIV. *Labium:* reaching apices of forecoxae; LIV longest segment. *Pronotum:* (Fig. 41) biconvex; lateral margins weakly carinate; collar narrow, reaching midwidth of eyes, posterior margin delimited by a deep nonpunctate groove; callosite region tumid, marked by a postero-transverse and sublateral punctate groove, with a faint, nonpunctate impression along midline, pronotal antero-lateral setae not present in available specimens; disc shorter in length than callosite region, rounded, posterior margin truncate. *Mesonotum:* large, declivent, visible from above. *Scutellum:* weakly rounded, lateral margin not punctate. *Hemelytra:* (Fig. 53) broad, extending well beyond lateral margins of pronotum; embolium broad, width greater than length of pronotal collar; anal vein punctate, elongate, almost reaching cuneal fracture; medial flexion line long, almost ¾'s of length of corium, shorter than R+M vein, strongly divergent to R+M vein; cuneus very large, longer than wide; membrane translucent, dusty, concolorous; without microsetae; membrane cell very narrow; membrane vein indistinct, without subcaudal thickening. *Thoracic pleura:* tergopleural suture distinct anteriorly; proepisternum subquadrate; proepimeron without pits; mesepimeron (Fig. 63) moderately sized, rugose, dorsal margin moderately angulate, dorso-caudal arm with a short lanceolate spiracular opening, with evaporative area, ventral margin marked by a weak depression; metepisternum scent efferent system (Fig. 63), occupying about half of the segment, not contiguous with metathoracic evaporative areas; peritreme submarginal to posterior margin of segment, dorsally dorso-caudally projected, tongue-shaped, weakly tumid at dorsal end, weakly raised above plane of evaporative areas; evaporative bodies mostly with rounded appearance; remainder of metepisternum weakly depressed. *Legs:* moderately long; coxae elongate; femora fusiform; three mesofemoral and four metafemoral trichobothria; tibiae cylindrical, with stiff, semiadpressed setae, without rows of spinelets; parempodia setiform. *Abdomen:* broad, anthocoridlike, venter semipolished. *Male genitalia:* left paramere at right angles to ventral margin of genital opening, straplike with a very small sensory lobe. Male aedeagus not examined.

Remarks.—*Termatophylella* is a monotypic genus restricted to Mexico. This genus is known from only two specimens. I did not examine the internal male genitalia of *T. fulvoides* pending the collection of more material of this species. Carvalho (1955a) distinguished *Termatophylella* from other termatophylines by the transverse head, however, this character also occurs in *Democoris* and *Kundakimuka.* The genus shows numerous similarities with the Australian endemic genus *Democoris,* but can be distinguished by characters of the bucculae and the peritreme of the scent efferent system (see *Democoris* Remarks section). *Termatophylella* is the sister genus of the clade containing *Kundakimuka* + *Democoris* + *Arygrotelaenus* + *Termatophylum,* and is united with this group by the presence of the enlarged eyes, which are contiguous with the posterior margin of the pronotum.

Termatophylella fulvoides Carvalho

Termatophylella fulvoides Carvalho 1955b: 644; Carvalho 1957: 35 (catalogue).

Figures.—9, 17, 25, 41, 53, 63.

Holotype.—Male. Mexico Br. Tex. 69391, 7/III/1950, 329, on orchid plants (USNM; type seen).

Other specimens examined.—Mexico, State of Vera Cruz, 3-20-1962, Jackson coll[ection], ex bromelaids (USNM; male).

Diagnosis.—This species is clearly differentiated from other Western Hemisphere termatophylines by the very narrow membrane cell (Fig. 53). The enlarged bucculae distinguishes it from all termatophylines.

Description.—Male. Small, length 2.26–2.51, width 1.24–1.30, mostly dark brown, with sparse cover of short semiadpressed, pale setae. *Head:* porrect, rounded, longer than wide, length 0.38, width 0.49–0.52, interocular distance 0.24–0.28, mostly dark reddish-brown, posterior margin and mandibular plate orange-brown, apex of clypeus red. *Eyes:* red, with short interocular setae, barely surpassing maximum height of ommatidia. *Antennae:* short, AI length 0.20 brown, fusiform; AII length 0.32, basally narrower than AI, weakly incrassate apically, yellow; AIII length 0.24, mostly yellow, weakly embrowned apically; AIV length 0.34, yellow, weakly fusiform. *Labium:* length 0.96, reaching mesocoxae; LI barely reaching posterior margin of bucculae; LII reaching proxyphus; LIII short of apices of forecoxae; LIV longest segment. *Pronotum:* uniformly fuscous; length 0.64, posterior width 0.94. *Mesonotum:* mostly fuscous, with reddish tinge. *Scutellum:* fuscous. *Hemelytra:* embolium reddish-brown; clavus and corium dark brown; membrane translucent, yellowish, cell narrow, subequal in width to length of pronotal collar, vein brown. *Legs:* femora dark brown, four meso- and six metafemoral trichobothria; tibiae mostly yellowish-brown, basally dark brown; tarsi yellow. *Abdomen:* dark brown. *Male genitalia:* genital capsule small, conical, mostly dark brown, tergite X orange brown; left paramere small, orange-brown, sensory lobe minute, shaft weakly arcuate, spatulate. Female unknown.

Remarks.—This species is known from orchids and bromelaids (Table 1), however, this information probably represents sitting records, and does not indicate true host plant records. More material is needed to fully describe this species, and field studies are needed to establish its hosts and habits.

Termatophylidea Reuter and Poppius

Termatophylidea Reuter and Poppius 1912: 2, 5, Usinger 1935: 271 (note), Carvalho 1952: 50 (list), Carvalho 1955a: 22 (key), Carvalho 1957: 35 (catalogue), Maldonado 1970: 119 (taxonomic history; species key), Callan 1975: 389–391 (biology).

Figures.—4, 12, 20, 28, 32, 36, 38, 44, 48, 49, 50, 58, 66, 70, 74, 79, 80, 86, 91, 97, 106, 114.

Type species.—*Termatophylidea pilosa* Reuter and Poppius 1912 by monotypy.

Diagnosis.—*Termatophylidea* is characterized by glassy, broad hemelytra, with the embolium enlarged. Unlike any other termatophyline, they do not have rows of punctations on the pronotum (Figs. 32, 36) and hemelytra (Fig. 48), and the anal vein of the clavus is present as a serrate groove (Figs. 49, 50). They also do not possess evaporative areas surrounding the metathoracic spiracle (Fig. 66), and they have a small pit along the anterior margin of the metepisternum (Fig. 58).

Description.—Elongate-ovoid to ovoid, mostly smooth with pronotum granulate; without rows of punctures on dorsum (Figs. 32, 48), with moderate cover of elongate, semierect, pale setae, arising from pronounced bases, intermixed with microsetae on hemelytra. *Head:* elongate (Fig. 4) strongly porrect (Fig. 12); vertex weakly rounded, postoccular margins either subparallel or moderately convergent posteriorly, posterior margin very weakly carinate; frons moderately narrowed; clypeus subhorizontal, terminating above antennifers; bucculae short, margins subparallel (Fig. 20); gula moderately broad, weakly concave, distinctly transversely rugose, without any distinctive vestiture. *Eyes:* small to moderately sized, separated from anterior margin of pronotal collar by a distance equal to or greater than width of second antennal segment; ommatidia large, with elongate, interocular setae. *Antennae:* moderately sized, subcylindrical, with AI, AIII and AIV subequal in length, and AII 3× to 4× longer than other segments; AI not thickened; AII thickest segment, incrassate apically (Fig. 28); AIII and AIV fusiform. *Labium:* reaching between apices of forecoxae and midlength of mesosternum. *Pronotum:* (Figs. 32, 36, 44) biconvex; lateral margins strongly divergent posteriorly; pronotal collar narrow (Fig. 32), extending to mid-width of eyes, marked posteriorly by a deep nonpunctate groove; callosite region marked by a deep, nonpunctate, transverse and sublateral groove (Fig. 36), incomplete mesally, with or without tubercles either side of midline contiguous with the posterior margin of the callosite region, mostly smooth, with a few setae restricted to the midline and below the posterior margin of pronotal collar; antero-lateral pronotal setae caudad of propleural suture; disc longer than callosite region, mostly with a granular appearance, with elongate, semierect setae with distinct raised bases, posterior margin weakly bisinuate. *Mesonotum:* visible from above, declivent, sometimes with a dense matt of whitish microsetae. *Scutellum:* lateral margins not punctate, sometimes with tubercles just caudad of anterior margin (Fig. 38). *Hemelytra:* (Figs. 48–50) hyaline; broad, widest caudad of midlength of corium; lateral margins strongly arcuate; anal vein sinuate (Figs. 48, 49), nonpunctate, region laterad of vein with dense matt of microsetae; embolium narrow, thickened; R+M vein not punctate, almost reaching cuneal fracture; corium broad, mostly glassy, sometimes with darker markings, weakly to moderately setate, setae with tuberculate, sometimes embrowned bases; medial flexion line either obscure and short or obsolete; cuneus either as long as wide, or usually longer than wide; membrane transparent to translucent, usually concolorous; with dense matt of microsetae; membrane cell large, subquadrate; membrane vein with subcaudal thickening. *Thoracic pleura:* tergopleural suture indistinct (Fig. 44), sometimes marked by a subanterior pit, remainder as a very weak depression; propleural suture indistinct, usually marked by a pit; proepisternum subquadrate; proepimeron usually with a subanterior pit; mesepimeron elongate (Fig. 58), usually smooth and shiny, dorsal margin weakly angulate, with narrow, lanceolate spiracular opening on dorso-caudal arm of dorsal margin (Fig. 66), without evaporative areas, lined with microsetae, ventral margin as a weak depression; metepisternum with reduced scent efferent system (Fig. 58), occupying about ⅓ of the segment, not reaching metathoracic spiracle, dorsal margin usually emarginate, peritreme (Fig. 70) tonguelike, broad, along midwidth of scent efferent system, dorsally directed, short of dorsal margin of scent efferent system, not raised dorsally or along posterior margin, above evaporative areas; evaporative bodies widely separated, caps mostly elongate (Fig. 74), much longer than wide, remainder of segment weakly depressed, anterior margin carinate, with a pit dorsad of dorsal margin of scent efferent system. *Legs:* elongate, cylindrical; coxae elongate; femora elongate and narrow, with four mesofemoral and six metafemoral trichobothria (Figs. 79, 80), with moderately dense distribution of elongate, semierect setae; tibiae elongate and narrow, cylindrical, with rows of spinelets (Fig. 86), intermixed with elongate, semiadpressed setae; pretarsus (Figs. 91, 97) with claws greatly thickened basally, apically strongly arcuate, parempodia setiform, not flattened apically. *Female abdomen:* broad. *Male abdomen:* subcylindrical. *Male genitalia:* genital capsule small, conical; left paramere minute (Fig. 106), with small sensory lobe, and shaft weakly arcuate, broad, and weakly enlarged apically; vesica (Fig. 114) with narrow membranous lobe, with a sclerotized process, directly connected to the termination of the ductus seminis, and almost reaching apex of vesica, no gonoporal cavity, lobal sclerites or fields of spines.

Remarks.—*Termatophylidea* is restricted to the Caribbean, Central America, and northern South America. *Termatophylidea* is atypical of most termatophylines in not having punctate rows on the pronotum and hemelytra. It is superficially similar to Deraeocorinae: Hyaliodini because of the glassy, broad hemelytra, however the head structure is markedly different. The head of *Termatophylidea* is strongly porrect like all other termatophylines. This genus is confidently retained in the Termatophylini because of the short first labial segment and the presence of antero-lateral pronotal setae. Aside from the nonpunctate dorsum it differs from other termatophylines most markedly in the form of the metathoracic spiracle and the male aedeagus. The spiracle lacks any surrounding evaporative areas, although the opening is exposed as in most termatophylines. The male genitalia are atypical for termatophylines in possessing a sclerotized process, which is connected to the apex of the ductus seminis. This is reminiscent of the male genitalia of some Hyaliodini (Kelton 1959), and suggests a possible relationship between the hyaliodines and the termatophylines. The present description of *Termatophylidea* is based on observations of *T. maculata, T. opaca,* and *T. pilosa,* and an undescribed species from Mexico, and the descriptions of other species by Carvalho (1955a) and Maldonado (1970). Callan (1975) has reviewed the biology of *Termatophylidea* species, and reports that *T. pilosa, T. maculata* and *T. opaca* are noted predators of thrip pest species.

Termatophylidea pilosa Reuter and Poppius

Termatophylidea pilosa Reuter and Poppius 1912: 5 (n. sp.), Usinger 1935: 271 (note), Myers 1935: 22 (biology), Carvalho 1952: 50 (list), Carvalho 1955b: 647 (description), Carvalho 1957: 36 (description), Maldonado 1970: 125 (key), Callan 1975: 389–391 (biology).

Figures.—106, 114.

Syntypes.—Male and female specimens. Mandeville, Jamaica (as Jamaika), IV/1906, [E.P.] Van Duzee (UZMH; not examined).

Specimens examined.—Jamaica, J. G. Myers, 1933 #3515, Brit. Mus. 1933-400 (NHM; male).

Diagnosis.—*Termatophylidea pilosa* is recognized by the embrowned markings on the clavus and corium. The male vesica is distinctive (Fig. 114), possessing a sclerotized process, however the male genitalia of no other *Termatophylidea* species has been examined.

Description.—Male. Small, length 3.10, width 1.20, uniformly yellow with hemelytra mostly transparent, with sparse cover of semierect, pale elongate setae. *Head:* extremely porrect, rounded, length 0.52, width 0.46, interocular distance 0.20; postoccular margins tumid; clypeus with lateral margins tinged with red; maxillary and mandibular plates yellow, tinged with red. *Eyes:* black, tinged with red, moderately sized. *Antennae:* AI length 0.24, with a few elongate, semiadpressed setae, yellow, with slight reddish tinge, AII length 0.70, uniformly and weakly swollen, with dense distribution of elongate, semiadpressed pale setae, uniformly yellow; AIII and AIV missing in available specimen. *Labium:* length 1.14, reaching just beyond the apices of the forecoxae; LII elongate, about twice length of

LIII. *Pronotum:* length 0.54, posterior width 0.82; mostly yellowish, with grooves and lateral margins embrowned and polished, with moderate distribution of elongate, semierect setae. *Scutellum:* moderately rounded, yellow, with a few elongate, semierect setae, with two minute processes on either side of the midline, just caudad of anterior margin. *Hemelytra:* mostly transparent with clavus and meso-caudal aspect of corium weakly embrowned; embolium thickened, with moderate distribution of semierect, elongate setae; corium with a few scattered semierect, elongate setae; membrane vein weakly tinged with red. *Legs:* uniformly yellow; femora very long, narrow, with moderate distribution of semiadpressed setae; tibiae elongate, cylindrical, with four rows of minute spines, with dense distribution of semiadpressed setae. *Abdomen:* not broad, subcylindrical, venter yellowish and brown laterally, with sparse distribution of elongate, semirect setae. *Male genitalia:* left paramere (Fig. 106); vesica (Fig. 114).

Female not available.

Remarks.—*Termatophylidea pilosa* has received some attention in the literature because it is a predator of the economic pest, the cacao thrips, *Selenothrips rubrocinctus.* Myers (1935) and Callan (1975) gave details of the biology of this species (see Biology section). Carvalho (1955b) redescribed this termatophyline species, and also recorded it from Central and South America. Usinger (1935) made a comparison of this species with *T. maculata,* and included a habitus illustration of the male of the species. Maldonado (1970) in a review of *Termatophylidea,* gave a key to species, and distinguished *T. pilosa* mainly on color characteristics.

Termatophylina Carvalho

Termatophylina Carvalho 1988: 235.

Figures.—5, 13, 21, 29, 33, 45, 54, 59, 67, 71, 75, 92, 98, 107, 115.

Type species.—*Termatophylina indiana* Carvalho, 1988: 235, by original designation.

Diagnosis.—*Termatophylina* is diagnosed by the narrow body and elongate appendages. It has numerous other apomorphies including the peritreme positioned on the posterior margin of metepisternum (Fig. 59) and the eyes distantly removed from the pronotum (Figs. 5, 13). The pronotum is similar to *Kundakimuka,* but the head is much longer in *Termatophylina.*

Description.—Elongate, parallel-sided, dark brown, coriaceous, with rows of punctures on pronotum (Fig. 33), and anal and R+M veins (Fig. 54), with moderate cover of elongate, pale, semierect setae. *Head:* elongate (Fig. 5), porrect (Fig. 13); vertex rounded, posterior margin not carinate; frons short; clypeus large, weakly declivent, terminating above antennifers; bucculae moderately large, wide, lateral margins arcuate (Fig. 21), posteriorly extending just beyond antennifers; gula elongate, moderately wide, weakly convex, weakly transversely rugose. *Eyes:* removed from the pronotum by a distance subequal to length of pronotal collar, moderately large; ommatidia small, with a few elongate, interocular setae. *Antennae:* relatively long, longer than head and pronotum combined; all segments cylindrical and narrow, AII cylindrical (Fig. 29). *Labium:* elongate and slender, reaching posterior margin of mesosternum; LII elongate reaching posterior margin of head; LIII longest segment, reaching midpoint of forecoxae. *Pronotum:* (Fig. 33) weakly flattened, subtrapezoidal; collar rounded, moderate length, broad, almost extending to lateral margins of eyes, posterior margin marked by a moderately deep, impunctate groove; callosite region marked by a sinuate, transverse, weakly punctate groove; antero-lateral pronotal setae elongate, dorsad of tergopleural suture and anteriad to propleural sulcus; disc region weakly rounded, subequal in length to callosite region, posterior margin weakly excavate on either side of midline. *Mesonotum:* relatively long and visible from above, weakly declivent. *Scutellum:* weakly flattened, not punctate. *Hemelytra:* (Fig. 54) narrow, barely surpassing posterior angles of pronotum; clavus broad with a punctate anal vein; embolium narrow, a little wider than width of first antennal segment; corium with an elongate, punctate R+M vein, about ¾ length of corium, subequal in length to a weakly divergent medial flexion line; cuneus slightly longer than wide; membrane with a moderately wide membrane cell. *Thoracic pleura:* tergopleural suture mostly distinct (Fig. 45), mesally obscure placed at midheight of eyes; propleural suture distinct; proepimeron subquadrate, explanate; proepisternum subquadrate, depressed; mesepimeron elongate (Fig. 59), broad, dorsal margin angulate, dorso-caudal arm bearing a lanceolate spiracular opening (Fig. 67), with evaporative bodies, ventral margin of mesepimeron marked by a depression; metepisternum with a well-developed scent efferent system (Fig. 71), dorsal margin contiguous with evaporative areas of mesepimeron; peritreme almost contiguous with posterior margin of metepisternum, tongue-shaped, posterior margin raised above evaporative areas; evaporative bodies subquadrate to elongate (Fig. 75); remainder of metepisternum weakly depressed, dorsally with elongate setae. *Legs:* all segments elongate, cylindrical; femora narrow, with four mesofemoral and six metafemoral trichobothria; pretarsi (Figs. 92, 98) with narrow, strongly C-shaped claws, weakly cleft basally, parempodia short and setiform. *Abdomen:* moderately broad, venter semipolished. *Male genitalia:* genital capsule small, conical; left paramere (Fig. 107) moderately large, sensory lobe weakly tumid, with a few sensory hairs, shaft, narrow, evenly arcuate, tapered apically; vesica (Fig. 115) with membranous lobe, gonoporal cavity present, with large, mesal, narrow, linear lobal sclerite.

Distribution.—India and Malaysia.

Remarks.—Carvalho (1988) described this genus from India, suggesting that it was closely allied to *Termatophylum.* From my investigations it is evident that *Termatophylina* differs considerably from *Termatophylum,* particularly in the head structure, with the former having an elongate head and the eyes greatly removed from the pronotal collar. Unlike any other termatophyline, *Termatophylina* has very small ommatidia. The scent efferent system is also distinctive, with the peritreme running along the posterior margin of the metepisternum. The pronotal grooves are also reduced, with the degree of punctation minimal, and unlike in *Termatophylum,* the posterior margin of the pronotal collar is not punctate. *Termatophylina* also contains an undescribed species from West Malaysia. This species is represented by two specimens in the Natural History Museum (London). This species is larger than *T. indiana,* but its overall facies are very similar to the type species.

Termatophylina indiana Carvalho

Termatophylina indiana Carvalho 1988: 236 (n. sp.).

Figures.—5, 13, 21, 29, 33, 45, 54, 59, 67, 71, 75, 92, 98, 107, 115.

Holotype.—Male. India: Calicut University, Madras, Suchitra col[lection], Nov[ember] 1987—Jan[uary] 1988 (NHM; not seen).

Specimens examined.—India: Kerala, Calicut Univer[sity] Campus, 22-II-1984, S. A. George, C.I.E.A. 15860 (NHM; male, 2 females).

Diagnosis.—*Termatophylina indiana* is distinguished from an undescribed *Termatophylina* species by its smaller size, and the shape of the lobal sclerite of the male genitalia (Fig. 115).

Description.—Male. Moderate size, length 2.73, width 0.74, mostly dark brown, with head lighter, and reddish and yellowish tinges on hemelytra, with moderate distribution of elongate, semiadpressed, golden setae. *Head:* elongate, length 0.53, width 0.42, interocular distance 0.18, vertex mesally medium brown, laterally yellow, maxillary and mandibular plates yellow; clypeus yellowish to yellowish-brown. *Eyes:* reddish-black. *Antennae:* with a moderate cover of semierect setae; AI length 0.22, yellow, sometimes proximally embrowned; AII length 0.55, yellow; AIII length 0.38, proximally more yellowish, distally reddish-brown; AIV length 0.24, reddish-brown. *Labium:* length 1.24. *Pronotum:* dark brown, with elongate, erect to semierect, golden setae, anterolateral pronotal setae dorsad of tergopleural suture, and anteriad of propleural suture. *Hemelytra:* mostly dark brown, embolium light brown, R+M vein reddish, cuneal fracture and antero-lateral margins of cuneus yellowish with reddish tinge; membrane dark brown, with dense cover of microsetae. *Legs:* mostly yellow, with meso and metafemora with subapical reddish tinge. *Male genitalia:* left paramere (Fig. 107); vesica (Fig. 115).

Female. Similar to male in structure, color and vestiture. Length 3.07–3.10, width 0.84–0.90. *Head:* length 0.52–0.69, width 0.43–0.46, interocular distance 0.17–0.21. *Antennae:* AI length 0.24; AII 0.50–0.54; AIII length 0.36–0.37, AIV 0.24–0.31. *Labium:* length 1.29–1.44.

Distribution.—India.

Host association.—Associated with the larval galleries of *Lamida moncusalis* Walker (Lepidoptera: Pyralidae).

Remarks.—Carvalho (1988) described *T. indiana,* and included a habitus illustration, and detailed figures of the male genitalia. His illustration of the male vesica indicates the presence of a sclerotized process. In my dissections the sclerite was not connected to the apex of the ductus seminis, and appeared to be associated with a gonoporal cavity as in most other termatophylines, and is therefore considered to be a lobal sclerite.

Termatophyloides Carvalho

Termatophyloides Carvalho 1955b: 641 (n. gen.), Carvalho 1955a: 36 (key), Carvalho 1957: 36 (catalogue).

Figures.—10, 18, 26, 42, 55, 64.

Type species.—*Termatophyloides pilosulus* Carvalho, 1955, by monotypy.

Diagnosis.—*Termatophyloides* is separated from other termatophylines by a combination of characters, and does not contain a single autapomorphy. Like *Termatophylum,* the callosite region of this genus has a longitudinal row of punctures along the midline. It can be separated from *Termatophylum* by the elongate, punctate R+M vein, which is longer than the median flexion line in *Termatophyloides.*

Description.—Ovoid; coriaceous; rows of punctures on pronotum (Fig. 42), anal vein and R+M veins (Fig. 55); moderate distribution of semierect, elongate setae. *Head:* elongate (Fig. 10), porrect (Fig. 18); vertex rounded; frons declivent, rounded; clypeus short, weakly declivent, terminating above antennifers; bucculae short, margins weakly arcuate (Fig. 26), not surpassed by first labial segment; gula elongate, narrow, weakly concave, lateral margins carinate, with transverse ridges, and a row of soft, moderate-sized, semierect setae adjacent to eyes. *Eyes:* large, almost contiguous with pronotal collar, distance less than the width of the second antennal segment; ommatidia moderately large; elongate interocular setae. *Antennae:* short; AI subcylindrical; AII weakly incrassate distally, AIII subequal to AII length, longer than AIV; AIII and AIV weakly fusiform. *Labium:* reaching apices of forecoxae; LII longest segment. *Pronotum:* (Fig. 42) weakly biconvex; lateral margins moderately divergent; collar broad, almost reaching lateral margins of eyes, separated from callosite region by a deep, nonpunctate groove, callosite region marked by a postero-transverse and sublateral, punctate groove, and punctate groove along midline; pronotal antero-lateral setae caudad of propleural suture; disc weakly biconvex, longer than callosite region, posterior margin truncate. *Mesonotum:* barely visible from above, strongly declivent. *Scutellum:* flattened, lateral margin not punctate. *Hemelytra:* broad, extending well beyond lateral margins of pronotum; lateral margins arcuate; anal vein punctate; embolium broad, subequal to pronotal collar length; punctate R+M vein short, only slightly surpassing ⅔ length of corium; medial flexion line much longer, and strongly divergent from the R+M vein; cuneus as long as wide; membrane translucent, dusty concolorous, without microsetae; membrane cell moderately broad, subelliptical, with a weak expansion subcaudally. *Thoracic pleura:* tergopleural suture distinct anteriad to propleural suture; proepisternum subquadrate, granulate; proepimeron weakly rugose, without pits; mesepimeron (Fig. 64) moderately short, broad, with dorsal margin strongly angulate, dorsocaudal arm of margin with a lanceolate, spiracular opening with evaporative areas, ventral margin marked by a weak depression, and a row of elongate, anteriorly directed, semiadpressed setae; metepisternum scent efferent system (Fig. 64) occupying about half of the segment, contiguous with metathoracic evaporative area; peritreme submarginal to posterior margin of segment, dorso-caudally projected, tongue-shaped, almost reaching dorsal margin of evaporative areas, not raised above plane of evaporative area; evaporative bodies mostly rounded, remainder of metepisternum depressed, with elongate, semiadpressed setae. *Legs:* moderately sized; coxae elongate; femora fusiform; three mesofemoral and four metafemoral trichobothria; tibiae cylindrical, not slender, with four rows of spinelets, and stiff, semiadpressed setae; pretarsi with basally toothed claws and setiform parempodia. *Abdomen:* broad, semipolished. *Male genitalia:* genital capsule small, genital opening small; left paramere at right angles to ventral margin of genital opening, shaft broad. Male aedeagus not examined.

Remarks.—Carvalho (1955b) described *Termatophyloides* from a single female specimen from Mexico. Carvalho (1955a) distinguished this genus from other termatophylines by the presence of a transverse punctate groove along the posterior margin of the callosite region, elongate pubescence, and the labium extending to the apex of the forecoxae. None of these characters are exclusive to *Termatophyloides,* and can no longer be considered diagnostic for the genus. A lack of material does not allow an examination of the male genitalia, however the genital capsule and the left paramere, indicate a close relationship with the other Central American genus *Termatophylella.* Miyamoto (1965) in describing a new species, *T. pallipes,* from Japan, indicated numerous differences from the type species, particularly in head structure. I have moved *T. pallipes* to *Kundakimuka,* on the basis of the similar head structure, although the presence of a punctate groove along the midline of the callosite region of this species is consistent with the present diagnosis of *Termatophyloides.*

Termatophyloides pilosulus Carvalho

Termatophyloides pilosulus Carvalho 1955b: 643 (n. sp.), Carvalho 1957: 36 (catalogue).

Figures.—10, 18, 26, 42, 55, 64.

Holotype.—Female. Mexico: Tamazunchale, San Luis Potosi, 30-XII-1948, coll[ector] Insp[ector] Leary, Laredo Tex[as], 49529, on orchids (USNM, 62946; type seen).

Other specimens examined.—Mexico on orchids, 10-10-1953, Brownsville, Tex[as] (USNM, male).

Diagnosis.—This species is recognized by the dark coriaceous body, the presence of a punctate groove along the midline of the callosite region, and the elongate R+M vein.

Description.—Male. Small. Length 2.17, width 1.20, mostly black, with elongate, semiadpressed vestiture. *Head:* conical, small, a little longer than wide, length 0.41, width 0.37, dark brown, with reddish tinge, particularly on apex of clypeus, and maxillary and mandibular plates. *Eyes:* red, removed from pronotal collar by a distance equal to width of second antennal segment, ommatidia of moderate size. *Antennae:* very small, mostly cylindrical, with a moderate distribution of pale, semiadpressed setae; AI small, a little thickened, length 0.13, dark brown; AII weakly expanded distally, mostly yellow, apex with a weak reddish tinge, length 0.24; AIII mostly yellow, with an apical red annulus, length 0.14; AIV red, length 0.14. *Labium:* yellow, small, reaching midlength of forecoxae; LII reaching midlength of eyes, longest segment; LIII reaching proxyphus. *Pronotum:* uniformly black, antero-lateral setae dorsad of tergopleural suture, and anteriad of propleural suture. *Legs:* coxae mostly dark brown, apices with reddish tinge; trochanters reddish; femora mostly dark brown, sometimes with obscure reddish tinge, apices yellow; tibiae yellow; tarsi yellow, TIII with obscure embrownment, longest segment. *Abdomen:* dark brown, broad, anthocoridlike, venter with regular, moderately distributed, elongate, adpressed, pale setae, posterior segments with a few elongate, erect setae, particularly laterally. *Male genitalia:* see generic description.

Female. Similar to male in color, shape and vestiture. Length 2.17, width 1.10. *Head:* length 0.40, width 0.34, interocular distance 0.16. *Pronotum:* length 0.40, posterior width 0.84. *Antennae:* AI length 0.14; AII length 0.24; AIII length 0.16; AIV length 0.16. *Pronotum:* length 0.40, posterior width 0.84.

Remarks.—This species, like *Termatophylella fulvoides,* has been taken on orchids, which probably represents a sitting record. It was intercepted in quarantine in Texas, USA. More material is needed for examination to firmly establish the relationships of this species.

Termatophylum Reuter

Termatophylum Reuter 1884a: 218 (n. gen.), Reuter 1884b: 167 (description), Reuter and Poppius 1912: 3, 5 (key; description), Carvalho 1952: 50 (list), Carvalho 1955a: 23 (key), Stichel 1956: 175 (key), Carvalho 1957: 36 (catalogue).

Figures.—6, 14, 22, 30, 34, 37, 46, 56, 60, 68, 72, 76, 80, 93, 94, 99, 100, 108, 109, 110, 116, 117, 118.

Type species.—*Termatophylum insigne* Reuter, 1884 by monotypy.

Diagnosis.—*Termatophylum* is separated from other termatophylines by the abbreviated punctate R+M vein (Fig. 56), which is shorter than the medial flexion line. The midline of the callosite region has a punctate groove (Figs. 34, 37) in *Termatophylum,* which is not the case in the saliently similar species of *Kundakimuka* (Figs. 31, 35). Also, the posterior margin of the callosite region of *Termatophylum* is punctate (Fig. 34), which is not the case in the phylogenetically related genus *Arygrotelaenus* (Fig. 39).

Description.—Elongate to elongate-ovoid; semipolished to weakly coriaceous; with rows of punctures on anal and R+M veins (Fig. 56), pronotum (Fig. 34) and scutellum, with sparse to moderate cover of semierect, pale setae. *Head:* transverse (Fig. 6) weakly porrect (Fig. 14); vertex weakly to moderately rounded, posterior margin weakly carinate; frons weakly declivent; clypeus moderately declivent, terminating above antennifers; lateral margins of bucculae subparallel (Fig. 22), terminating caudally at midpoint of antennifers; gula elongate, narrow, concave, with transverse ridges, and matt of microsetae (Fig. 22). *Eyes:* very large, covering the lateral aspect of the head, almost touching pronotum (Fig. 14), separated by a distance less than the width of the second antennal segment, ommatidia large, with short to elongate, interocular setae. *Antennae:* short to moderately long, with semiadpressed setae, in males intermixed with flattened, scalelike, adpressed setae on AII; AI short, weakly thickened; AII swollen and fusiform in male (Fig. 30), cylindrical and weakly incrassate subapically in females, AIII cylindrical, AIV weakly fusiform, not swollen. *Labium:* reaching between apices of forecoxae and apex of mesosternum; LII longest segment. *Pronotum:* (Figs. 34, 37, 46) lateral margins strongly divergent, weakly to moderately biconvex; collar rounded, not wide, barely reaching midwidth of eyes, posterior margin marked by a deep punctate groove; callosite region (Fig. 34), marked by a transverse and sublateral, punctate groove, and a short, midline, punctate groove (Fig. 37); calli separated and moderately tumid antero-lateral pronotal setae anteriad of propleural suture; disc longer than callosite region, moderately raised above callosite region in lateral view, posterior margin truncate. *Mesonotum:* short to very short, visible from above. *Scutellum:* flattened to weakly rounded, lateral margins each with a row of punctations, rarely along entire length. *Hemelytra:* (Fig. 56) not broad, barely surpassing posterior angles of pronotum, margins subparallel to weakly arcuate; anal vein punctate; embolium narrow, mostly less wide than width of second antennal segment of male; punctate R+M vein, usually surpassing midlength of medial flexion line, rarely beyond, sometimes with punctations less deep and distinct than punctures of anal vein and pronotum; medial flexion line elongate, almost reaching cuneal fracture, not strongly divergent from R+M vein, subparallel anteriorly; cuneus as wide as long; membrane translucent to opaque with a bicolored pattern, usually pale anteriorly and brown posteriorly, membrane cell large, subquadrate, vein somewhat indistinct, sometimes thickened subcaudally. *Thoracic pleura:* tergopleural suture distinct anteriorly (Fig. 46); proepisternum, subtriangular; proepimeron with a pit ventro-mesally placed; mesepimeron (Fig. 60) broad, dorsal margin strongly angulate, dorso-caudal arm with a small band of evaporative areas, spiracular opening (Fig. 68) not visible, recessed, ventral margin of mesepimeron marked by a depressed line; metepisternum scent efferent system (Fig. 60) occupying almost half of segment, not contiguous with evaporative areas of mesepimeron, with peritreme at midlength or just posteriad of mid-length of evaporative areas, peritreme (Fig. 72) weakly depressed, lanceolate and narrow, to moderately broad and tonguelike, not raised dorsally or posteriorly above plane of evaporative areas; evaporative bodies variable, mostly elongate (Fig. 76), remainder of segment weakly depressed with a few semierect, pale setae. *Legs:* moderately long; femora fusiform, not greatly swollen; four mesofemoral and six metafemoral trichobothria; tibiae cylindrical, without any rows of spinelets, with stiff, semiadpressed pale setae; pretarsi (Figs. 94, 100) with claws strongly cleft basally, and angulately C-shaped, with short, flattened, ribbonlike parempodia. *Abdomen:* broad, polished, with moderate distribution of soft, semiadpressed setae; *Male genitalia:* genital capsule conical (Fig. 101, 102); genital opening small; left paramere (Figs. 108–110) with a very short sensory lobe, with a few short, erect, pale setae, shaft arcuate, sometimes evenly tapered apically, sometimes broader and spatulate apically; vesica (Figs. 116–118) with a membranous lobe, with a gonoporal cavity, and one or two sickle-shaped, lobal sclerites, apex of membranous lobe with fields of spines.

Remarks.—*Termatophylum* is the most diverse genus of the termatophylines, and presently contains 13 species, of which, all except one, are confined to the Old World, particularly the tropical and subtropical regions. *Termatophylum montanum* was described from Brazil by Carvalho (1983) but has not been examined in this study. Reuter (1884a) first described the genus for a species from Egypt. Reuter and Poppius (1912) provided a detailed redescription of the genus and listed diagnostic characters for *Termatophylum* in a key to the known genera. They separated *Termatophylum* and *Arygrotelaenus* primarily on the presence of hairy eyes in the former genus, which remains a valuable distinguishing character. Carvalho's (1955a) generic key to the termatophylines did not contain any significant diagnostic characters, and incorrectly stated that the pronotum did not have rows of punctures behind and between the calli. *Termatophylum* is now clearly recognized by the punctation of the pronotum and characters of the pterothoracic pleura and male genitalia. The biology of *Termatophylum* is poorly known with host plant records known for *T. insigne* and *T. melaleucae* (see Table 1 and Biology section).

Termatophylum insigne Reuter

Termatophylum insigne Reuter 1884a: 218 (n. sp.), Reuter 1884b: 168 (description), Reuter and Poppius 1912: 7, 9 (key, description), Carvalho 1952: 50 (type species), Stichel 1956: 175 (description), Carvalho 1957: 36 (catalogue), Linnavuori 1974: 3, 4 (diagnosis; species key), Linnavuori 1975: 6 (Egypt; host plant), Linnavuori 1980: 15 (Sudan), Linnavuori 1989: 29 (Yemen).

Figures.—93, 99, 108, 116.

Holotype.—Female. Egypt (as Aegyptus) (?UZMH; not seen).

Specimens examined.—Sudan: Kordofan, Tendelti-Umm Ruwaba, 25-1-1963, R. Linnavuori (NHM; male); Sudan: N[orthern] Prov[ince] Ed Dammer-Shendi 1-XI-1962, R. Linnavuori (NHM; male); Sudan: Khartoum, junction of Niles, 23-1-1966, P.

Štys collector (AM; female); Sudan: Khartoum, Sunt Forest, 19-11-1965, P. Štys collector (AM; 3 males; female); Sudan: Khartoum, Burri, 10-1965, P. Štys collector (AM; female); Sudan: Khartoum, Burri, 10-12-1965, Williams collector (AM; male).

Diagnosis.—*Termatophylum insigne* is distinguished by the color pattern of the dorsum; mostly brown, with yellowish markings. The male left paramere (Fig. 108) and the vesica (Fig. 116) are also distinctive for the species.

Description.—Male. Small, parallel-sided, length 2.33–2.64, width 0.84–0.93, mostly yellowish-brown, with brown and yellow markings, hemelytra opaque, with sparse cover of semiadpressed, short, golden setae. *Head:* uniformly brown, with uniform distribution of short, whitish, adpressed setae, moderately porrect, length 0.43–0.48, width 0.53–0.56, interocular distance 0.14–0.17; maxillary and mandibular plates yellowish-brown, sometimes with reddish; gula yellow. *Eyes:* reddish-black, with moderately elongate, interocular setae. *Antennae:* AI short, length 0.14–0.17, barely passing apex of clypeus, yellow, with a few semiadpressed setae; AII length 0.39–0.44, fusiform, uniformly swollen, proximal half to two-thirds yellow, distal half to third brown, sometimes with reddish tinge, particularly at apex, with moderate cover of flattened, adpressed, scalelike, whitish setae, intermixed with elongate, semiadpressed setae; AIII cylindrical, much narrower than AII, length 0.22–0.24, yellow, with moderately sized semiadpressed, pale setae AIV weakly fusiform, length 0.14–0.17, vestiture as AIII. *Labium:* slender but not fragile, reaching apices of forecoxae, length 0.98–1.00, LII longest segment but only slightly longer than LIII. *Pronotum:* with sparse cover of moderately long, semi-erect, pale setae; collar yellowish-brown, laterally more brown; callosite region yellowish-brown, with grooves and lateral regions darker brown; disc uniformly brown. *Mesonotum:* barely visible from above. *Scutellum:* anterior half brown, posterior half yellow to yellowish-brown, with sparse cover of semierect, moderately sized, pale setae. *Hemelytra:* with sparse cover of semiadpressed, moderately sized, pale setae on clavus, embolium, corium and cuneus; clavus yellowish brown, with inner margins darker; embolium R+M vein short, about ¾ length of medial flexion line, R+M vein only weakly punctate, mostly yellowish, posteriorly embrowned; corium with anterior ⅔'s laterad of medial flexion line vein yellow to yellowish-brown, remainder brown, except for indistinct yellow marking mesally above cuneal fracture; cuneus antero-laterally yellow, remainder brown; membrane with vein embrowned, membrane patterned, mostly brown, with two indistinct yellow markings posteriad of cuneus, without any apparent microsetae. *Thoracic pleura:* proepisternum proximally brown, distally yellow, proepimeron proximally brown, distally yellow; proxyphus uniformly yellow. *Legs:* moderately sized, mostly yellow with distal half of metafemora shiny brown; metafemora almost 1.5× longer than mesofemora; tibiae and tarsi yellow. *Abdomen:* broad, anthocoridlike, brown, shiny. *Male genitalia:* left paramere (Fig. 108); vesica (Fig. 116) with a sickle-shaped lobal sclerite, and two ill-defined, basal lobal sclerites.

Female similar to male in color, shape and vestiture. Length 2.67–2.79, width 0.86–0.96. *Head:* length 0.45–0.49, width 0.52, interocular distance 0.16–0.18. *Antennae:* AI length 0.15–0.16, uniformly dark brown; AII cylindrical, weakly expanded distally, yellow; AIII length 0.24, yellow; AIV length 0.16–0.18, yellow. *Labium:* length 0.94–0.96. *Pronotum:* length 0.59–0.60, posterior width 0.82–0.88.

Remarks.—This species is broadly distributed in the Middle East, including the Sudan, and is known to inhabit *Acacia* (Linnavuori 1975). Reuter (1884a) briefly described the species from a single female specimen. Reuter and Poppius (1912) gave a detailed description of the species, including the male, and differentiated it from other *Termatophylum* species, primarily on color characteristics. Stichel (1956) briefly described the species, and Linnavuori (1974) gave a detailed diagnosis, including structural and color features. The majority of *Termatophylum* species are differentiated on external color characters, and a study of the male genitalia is necessary to confirm the validity of these species.

Termatophylum melaleucae Cassis n. sp.

Figures.—6, 14, 22, 30, 34, 37, 46, 56, 60, 68, 72, 76, 94, 100, 108, 109, 117.

Eytomology.—This species is named after its host-plant genus association.

Holotype.—Male. QLD: 19:18.2S 146:49.1E, Townsville, Oonoonba Kennan St[reet] 19 May 1993, L. M. Brown, NQMqn93028.PO41-042, ex *Melaleuca quinquenervia* (AM).

Specimens examined.—Paratypes: QLD: 19:18.2S 146:49.1E, Townsville, Oonoonba Kennan St[reet], 19 May 1993, L. M. Brown, NQMqn93028.PO41-042, ex *Melaleuca quinquenervia* (AM; 1 male; 2 females); QLD: Heathlands, 11:45S 142:35E, 18 August 1992, J. Cardale, P. Zborowski, at light (ANIC; male); QLD: 18:07.9S 145:55E, 21.8 km S Tully, Double Barrel C[ree]k Swamp, 11 May 1993, J.K. Balciunas, NQMMqn93026.P099, ex *Melaleuca quinquenervia* (AM; female).

Diagnosis.—*Termatophylum melaleucae* is distinguished by the bicolored hemelytral membrane. It is also differentiated from its close relative, *T. weiri*, by the spatulate apex of the left paramere (Fig. 109), and the single lobal sclerite (Fig. 117).

Description.—Male. Small, length 2.51–2.73, width 0.96–1.02, parallel-sided, mostly dark brown, with moderate cover of pale, semierect setae. *Head:* length 0.38–0.48, width 0.51–0.53, interocular distance 0.12–0.15, vertex and frons mostly dark brown to black, clypeus, maxillary and mandibular plates dark brown, sometimes with reddish tinge. *Eyes:* reddish-dark brown. *Antennae:* with moderate cover of semierect setae, less so on AI; AI length 0.16–0.18, dark brown, with moderate to strong reddish tinge; AII length 0.36–0.41, mostly dark brown with reddish tinge, sometimes with base yellow, also with short flattened, scalelike setae; AIII length 0.23–0.24, dusty yellow; AIV length 0.21–0.24, dusty yellow. *Labium:* length 0.96–1.08, yellow, LII longest segment, reaching base of forecoxae, LIII reaching apex of forecoxae, LIV reaching posterior margin of mesosternum. *Pronotum:* dark brown to black, grooves darker, posterior margin with a minute, pale yellowish band; length 0.49–0.58, width 0.84–0.86. *Scutellum:* flattened, mostly dark brown to black, apex with yellow marking. *Hemelytra:* color variable, mostly with clavus and cuneus dark brown to fuscous, embolium reddish-brown to brown, with corium brown, but darker mesally, but sometimes hemelytra lighter brown, with clavus and corium with reddish tinge, and lateral aspect of corium almost translucent, medial flexion line and R+M veins usually darker; R+M vein occupying ¾ to ⅘ of corium, medial flexion line more than ⅘ of corium; membrane with moderate cover of pale microsetae, bicolored, with anterior half pale to translucent, remainder pale to medium brown, anterior margin of darker areas V-shaped, cell moderate size, mostly pale, with vein weakly raised, and caudal half embrowned, and weakly thickened caudo-laterally. *Legs:* mostly yellow. *Genitalia:* left clasper (Fig. 109) with apex of shaft spatulate; vesica (Fig. 116), with one sickle-shaped lobal sclerite.

Female similar to male in shape but more elongate-ovoid; color similar, in some specimens hemelytra sometimes more uniformly dark brown, with lighter markings along cuneal fracture; vestiture similar to males. Length 2.63–3.04, width 1.10–1.20. *Head:* length 0.48–0.49, width 0.52–0.54, interocular distance 0.16–0.17. *Antennae:* AI length 0.19–0.24, dark brown to fuscous; AII length 0.37–0.43, weakly incrassate apically, proximal ⅔ yellow, remainder dark brown to fuscous, sometimes with reddish tinge; AIII length 0.24–0.26, dusty yellow; AIV length 0.21–0.22, dusty yellow. *Labium:* length 1.02–1.08. *Pronotum:* length 0.48–0.50, posterior width 0.90–0.94.

Remarks.—This species is easily recognized by the patterned hemelytral membrane. The description of this species is based on specimens from northern Queensland, however, numerous specimens from southern Queensland, acquired after the observational phase of this work, appear to be conspecific, which suggests that the species is broadly distributed in the coastal region of the State. This needs to be confirmed by examination of the male genitalia.

Termatophylum weiri **Cassis n. sp.**

Figures.—110, 118.

Eytomology.—This species is named after the collector Tom A. Weir, of the Australian National Insect Collection, CSIRO, Canberra.

Holotype.—Male. QLD: 15.47S 145.17E, Moses C[ree]k, 4 km N by E of Mt. Finnigan, 14–16 October 1980, T. Weir (ANIC).

Other specimens examined.—Paratypes: QLD: 15.47S 145.17E, Moses C[ree]k, 4 km N by E of Mt. Finnigan, 14–16 October 1980, T. Weir (ANIC; 1 male; 2 females); QLD: Cairns district, F. P. Dodd (SAMA; female).

Diagnosis.—*Termatophylum weiri* is recognized by the unicolorous hemelytral membrane, the evenly tapered apex of the left clasper (Fig. 110), and the vesica with two lobal sclerites.

Description.—Male. Small, length 2.29–2.33, width 0.85–0.90, parallel-sided, mostly light brown, with sparse cover of elongate, semiadpressed pale setae. *Head:* length 0.36–0.40, width 0.46–0.52, interocular distance 0.12, vertex fuscous, clypeus, maxillary and mandibular plates reddish-brown. *Eyes:* fuscous, with a reddish tinge. *Antennae:* AI length 0.14–0.15, not thickened, yellowish-brown, with a few erect, pale setae; AII length 0.38–0.40, yellowish-brown, with moderate cover of erect, brown, elongate, bristlelike setae, and short, flattened, adpressed pale setae; AIII length 0.22–0.24, cylindrical, narrow, yellow, with moderate cover of elongate, semierect, pale setae; AIV length 0.16–0.17, narrow, weakly fusiform, with moderate cover of elongate, semierect, pale setae. *Labium:* length 0.88–0.96, reaching beyond midlength of mesosternum; LII longest segment, reaching midlength of forecoxae; LIII reaching beyond apices of forecoxae. *Pronotum:* subtrapezoidal, mostly yellowish-brown; collar light yellowish-brown; callosite region yellowish-brown, but darker than pronotal disc and collar; pronotal disc yellowish-brown. *Scutellum:* brown, with anterior half with fuscate tinge, lateral margins with weak punctations. *Hemelytra:* clavus yellowish-brown, with darker embrownment particularly along anal vein; corium yellowish brown, R+M vein punctations not deep, not embrowned, barely surpassing midlength of medial flexion line, setal bases fuscous; membrane yellowish, translucent, without any color pattern, membrane cell large, subquadrate, vein weakly embrowned. *Genitalia:* left clasper (Fig. 110) with apex of shaft evenly tapered; vesica (Fig. 117) with two sickle-shaped lobal sclerites.

Female. Similar to male in structure and color. Length 2.17–2.29, width 0.93–0.96. *Head:* length 0.38, width 0.46, interocular distance 0.12–0.14. *Antennae:* AI length 0.16, AII length 0.36, weakly incrassate apically: AIII length 0.22–0.24; AIV length 0.18–0.19. *Labium:* length 0.89–0.96. *Pronotum:* length 0.50–0.53, posterior width 0.78–0.82.

Remarks.—There is some doubt as to whether the female from Moses Creek, QLD, is conspecific with the holotype male from the same locality, as it is considerably darker. The female from the Cairns district is saliently very similar to the holotype male, particularly in the lighter coloration.

GENERA REMOVED FROM THE TERMATOPHYLINI

Conocephalocoris Knight, 1927

Conocephalocoris Knight 1927: 141 (n. sp.), Carvalho 1952: 53 (list), Carvalho 1955a: 22 (key), Carvalho 1957: 35 (catalogue).

Type species.—*Conocephalocoris nasicus* Knight, 1927, by monotypy.

Specimen examined.—USA: Utah, Washington Co., Leeds Canyon, 28 July 1965, W. J. Hanson collector (Utah State University; male).

Remarks.—*Conocephalocoris* was originally described in the Deraeocorini by Knight (1927), which was followed by Carvalho (1952). Carvalho (1955a) transferred the genus to the Termatophylini, presumably on the basis of the elongate, porrect head. His diagnosis of the Termatophylini refers to the short antennae, but in *Conocephalacoris* the antennae are elongate, with the second segment extremely long and thickened. Carvalho (1957) retained its position within the Termatophylini in his world catalogue.

Conocephalocoris cannot be retained in the Termatophylini, as presently defined. There is little doubt that it is similar to termatophylines, in possessing rows of punctures on the pronotum, and R+M and anal veins. However, these characters are present in numerous other Deraeocorinae, particularly the Hyaliodini. The head of *Conocephalocoris* is porrect, but this has evidently been independently derived in the termatophylines, and some Deraeocorini genera, such as *Conocephalocoris, Eurychilopterella* Reuter, *Hesperophylum* and *Termatomiris. Conocephalocoris* has interocular setae, which has not been observed in any other non-termatophyline Deraeocorinae, and is present in all termatophylines, except *Arygrotelaenus.*

The short first labial segment, not surpassing the posterior margin of the bucculae, is the most critically defining character for the Termatophylini. In *C. nasicus* the first labial segment far surpasses the bucculae. The pterothoracic pleura of this species are different to the termatophylines, with the dorsal margin of the mesepimeron almost linear, carinate, and without an exposed spiracular opening, or associated evaporative areas. The peritreme of the scent efferent system of the metepisternum is spoutlike, and greatly raised above the evaporative areas, and is unlike any Termatophylini. The pronotum *C. nasicus* has an indistinct callosite region, but is not bounded posteriorly and sublaterally by a deep groove.

Numerous other characters of *C. nasicus* are not present in other termatophylines, and these include: 1) clavus with an incomplete punctate anal vein, and a punctate longitudinal groove, antero-mesally placed; 2) hemelytra much longer than abdomen; 3) membrane with two cells; 4) labium extremely elongate, reaching last abdominal segment; 4) absence of antero-lateral pronotal setae.

Stonedahl (personal communication) is presently reviewing the North American genera *Conocephalocoris, Eurychilopterella* and *Hesperophylum,* and has indicated support for my conclusions. It is unknown at present whether these genera, and genera such as *Termatomiris,* form a monophyletic group, which are defined by having a porrect head.

Hesperophylum Reuter and Poppius, 1912

Hesperophylum Reuter and Poppius 1912: 3, 16 (n. gen.), Knight 1941: 64, 74 (key), Carvalho 1952: 50 (list), Carvalho 1955a: 22 (key), Carvalho 1957: 35 (catalogue).

Type species.—*Hesperophylum heidemanni* Reuter and Poppius, 1912, by monotypy.

Remarks.—*Hesperophylum* was described in the Termatophylini by Reuter and Poppius (1912), predominantly on the basis of the porrect head. This North American monotypic genus is removed from the Termatophylini on the same basis as *Conocephalocoris*; it has an elongate first labial segment which extends far beyond the bucculae. It also differs from termatophylines by the following characters: 1) flattened second antennal segment; 2) callosite region not demarcated posteriorly by a groove; 3) anal vein reduced to posterior half of clavus; 4) labial segment elongate, surpassing apices of metacoxae; 5) presence of two membrane cells; 6) absence of antero-lateral pronotal setae.

Termatomiris Ghauri, 1975

Termatomiris Ghauri 1975: 615.

Type species.—*Termatomiris proboscidocoris* Ghauri, 1975, by original designation.

Specimen examined.—Female. QLD: Lankelly, B. Gray, ii-vii-1972 (NHM; paratype).

Remarks.—Ghauri (1975) described this Australian taxon in the Termatophylini, primarily because of the porrect head. He indicated that it was similar to the mirine genus *Proboscidocoris* Reuter, but was clearly a member of the Deraeocorinae on the basis of the basally cleft claws and setiform parempodia. *Termatomiris* is removed from the Termatophylini, because of the elongate first labial segment, and transferred to the Deraeocorini.

Termatomiris differs from termatophylines by the following characters: 1) first labial segment longer than bucculae; 2) ommatidia small; 3) absence of interocular setae; 5) absence of antero-lateral pronotal setae; 6) pronotum bipartite; 7) without rows of punctures on pronotum and hemelytra; 8) two membrane cells; 9) dorsal margin of mesepimeron not angulate; 10) metathoracic spiracle not exposed; 11) mesepimeron without evaporative areas; 12) peritreme dorsally expanded and raised.

PHYLOGENY OF THE GENERA OF TERMATOPHYLINI

The 29 characters and the 68 character states utilized in this analysis are those of head, eyes, labium, antennae, pronotum, scutellum, hemelytra, pterothoracic pleura, parempodia and male genitalia. The character and character state descriptions are presented in Table 2, and the data matrix for outgroups and Termatophylini is given in Table 3. One cladogram of 66 steps (Fig. 131) was produced, with a consistency index of 0.59 and a retention index of 0.69. The character state changes for the ancestral nodes and terminal taxa are given in Table 4. The following discussion of sister-group relationships is based on the character state changes at the designated ancestral nodes. Discussion is restricted to synapomorphic characters, except for Node 9, which is only supported by homoplasious characters.

Node 9.—The sister-group relationship of *Hesperophylum* and *Conocephalocoris* + Termatophylini is based on the following characters: elongate head (1-1) and the porrect head (9-2). Both characters are labile within the Termatophylini, and other Deraeocorinae, not included in this analysis. The elongate head state is found in the basal genera of the Termatophylini, and the apomorphic genus *Arygrotelaenus,* in which it is independently derived. The porrect head has been ascertained by the degree of declivity of the clypeus, which is also variable within the Termatophylini. Both these head characters are partially correlated, however in *Termatophyloides,* the clypeus is moderately declivent and the head is elongate. The porrect head is found in other Deraeocorini, such as *Termatomiris* and *Eurychilopterella,* and my analysis suggests that this character state has independently arisen often in the Deraeocorinae. From this it is evident that previous definitions of the Termatophylini (Carvalho 1955a), based on the porrect head, are artificial, and therefore, *Conocephalocoris* and *Hesperophylum* are removed from the Termatophylini.

Node 8.—The sister-group relationship of *Conocephalocoris* and the Termatophylini is based on the following synapomorphies: interocular setae present (8-1) and the absence of a sclerotized process (28-1). The presence of interocular setae is diagnostic for all termatophylines, except for *Arygrotelaenus,* where the lack of setae is interpreted as a secondary loss. The presence of interocular setae appears to be widespread within the Miridae, however in most of the Deraeocorinae, the eyes appear to lack these setae, and *Conocephalocoris* is the only non-termatophyline Deraeocorinae examined which has interocular setae. The examination of the male genitalia outside of the termatophylines has been limited in this study, and the significance of the sclerotized process is not understood.

Node 7.—The Termatophylini are defined as a monophyletic group in this analysis by the following synapomorphies: short first labial segment (3-1), the presence of antero-lateral pronotal setae (12-1) and the condition of the metathoracic spiracle (21-1). The first labial segment is extremely ab-

Table 2. Characters and character states used in cladistic analysis of Termatophylini genera.

1) Head shape	0 = transverse, 1 = elongate
2) Bucculae shape	0 = parallel-sided, 1 = moderately arcuate, 2 = strongly arcuate
3) Labial segment I	0 = longer than bucculae, 1 = as long as bucculae
4) Gula vestiture	0 = without microsetae, 1 = with microsetae on lateral margins, 2 = with dense matt of microsetae
5) Eye size	0 = large, 1 = very large
6) Eye position	0 = removed from pronotal collar by distance greater than AII width, 1 = contiguous with pronotal collar
7) Ommatidia size	0 = small, 1 = large
8) Interocular setae	0 = absent, 1 = moderately distributed, 2 = densely distributed
9) Clypeus	0 = vertical, 1 = moderately distributed, 2 = densely distributed
10) Male AII shape	0 = cylindrical, incrassate apically, 1 = fusiform and flattened, 2 = fusiform and swollen
11) Male AII vestiture	0 = setiform only, 1 = setiform intermixed with flattened scale-like setae
12) Antero-lateral pronotal setae	0 = absent, 1 = present
13) Pronotal collar	0 = posterior margin not punctate, 1 = punctate
14) Callosite region	0 = posterior margin not punctate, 1 = punctate
15) Callosite region	0 = midline without groove, 1 = with punctate groove
16) Scutellum	0 = lateral margins not punctate, 1 = punctate
17) R+M vein	0 = longer than median flexion line, 1 = equal to or shorter than median flexion line
18) Hemelytral membrane	0 = concolorous, 1 = bicoloured
19) Membrane cell	0 = broad, 1 = narrow
20) Mesepimeron shape	0 = elongate, 1 = broad
21) Metathoracic spiracular opening	0 = not evident, pleura separated, 1 = visible as a lanceolate/oval opening, 2 = not visible, recessed
22) Scent efferent system evaporative areas	0 = contiguous with mesepimeric evaporative areas, 1 = not contiguous with mesepimeric evaporative areas
23) Peritreme	0 = anteriad to midwidth of evaporative areas, 1 = at midwidth of evapoarative areas, 2 = caudad of midwidth of evaporative areas, 3 = along posterior margin of metepisternum
24) Parempodia	0 = setiform, 1 = setiform, apex weakly flattened, 2 = flattened, ribbon-like
25) Male genital opening	0 = left margin without tubercle, 1 = left margin with tubercle
26) Gonoporal cavity	0 = absent, 1 = present
27) Lobal scletites	0 = absent, 1 = elongate, 2 = sickle-shaped
28) Sclerotized process	0 = present, 1 = absent
29) Vesica apex	0 = without fields of spines, 1 = with fields of spines

breviated in the Termatophylini, and terminates caudally at the posterior margin of the bucculae. This condition has not been reported in any other Miridae, nor any other Deraeocorinae examined in the course of this study. The first labial segment in the Miridae is the most robust of all the segments, and greatly surpasses the posterior margin of the bucculae, and usually reaches the posterior margin of the head. Schuh and Stys (1991) in a cladistic review of the Cimicomorpha indicate that the elongate first labial segment is a synapomorphy for the Miroidea, and that the short to absent first labial segment is in the ground plan for the Cimicomorpha. The short first labial segment of the Termatophylini is undoubtedly of independent origin, and cannot be presently supportive of any alternative taxonomic arrangement of the tribe, outside of the Miroidea. Curiously, despite there being no doubt about the carnivorous habit of the Termatophylini (Callan 1975), their labium is extremely slender and fragile. The strong-

Table 3. Character matrix of four outgroups, eight termatophyline genera and 29 characters. Missing data = ?.

	00000000011111111112222222222
	12345678901234567890123456789
Ambracius	0200000000000000000000?100?000
Bothynotus	02000000000000100000?100?000
Hesperophylum	120000002100000100000?10?????
Conocephalocoris	120000012000100100000?000?011
Arygrotelaneus	10120110221100011101211211211
Democoris	02111112100111010011211001110
Kundakimuka	02111112100111010001102101010
Termatophyllella	0211011110010101001110200????
Termatophylidea	101100112001000000001?1000000
Termatophylina	11100001200101001000103001110
Termatophyloides	1111001110010111000110200????
Termatophylum	01121112121111111101211211211

ly robust and elongate first labial segment of *Conocephalocoris* and *Hesperophylum* supports their removal from the Termatophylini. The presence of antero-lateral pronotal setae appears to be unique to the Termatophylini, and is very similar in form to that found in some Anthocoridae, but must be considered to be independently derived.

Table 4. List of character state changes at ancestral nodes and terminal taxa for Figure 131.

9:	1-1, 9-2
8:	8-1, 28-1
7:	2-1, 3-1, 12-1, 16-0, 21-1
6:	4-1, 7-1
5:	9-1, 14-1, 16-1, 20-1, 23-2
4:	1-0, 2-2, 6-1
3:	5-1, 8-2, 13-1
2:	21-2, 22-1, 23-1, 27-1
1:	2-1, 4-2, 10-2, 11-1, 17-1, 18-1, 24-2, 25-1, 27-2, 29-1
Ambracius	16-0
Hesperophylum	10-1
Conocephalocoris	13-1, 23-0, 29-1
Termatophylina	14-1, 17-1, 23-3, 27-1
Termatophylidea	2-0, 26-0, 28-0
Termatophyloides	15-1
Termatophylella	19-1
Kundakimuka	24-1
Democoris	19-1
Termatophylum	15-1
Arygrotelaenus	1-1, 2-0, 5-0, 8-0, 9-2, 13-0, 14-0

The condition of the metathoracic spiracle has undoubted phylogenetic value in the Miridae (Cassis 1984, Cassis in preparation). The spiracular opening in the Termatophylini is clearly visible, although sometimes recessed (Node 8), and is unlike that in any other Deraeocorinae. In the Termatophylini the dorso-caudal arm of the dorsal margin of the mesepimeron is highly modified, with the posterior angle recurved cephalically, and subsiding below the dorsal margin, at times partially fused with the anterior margin of the metepisternum. The spiracular opening in termatophylines, except in *Termatophylidea,* is bounded by evaporative bodies, which presumably function as a barrier to allosomes from entering the respiratory system. In other Deraeocorinae, such as *Deraeocoris* (Fig. 122), *Hyaliodes* (Fig. 120) and *Trilaccus* (Fig. 121), the mesepimeron and metepisternum are confluent, and the spiracular opening is assumed to be intersegmental, deeply recessed, and not visible or differentiated, as in the Termatophylini. Also, the dorso-caudal arm of the dorsal margin of the mesepimeron of these non-termatophylines is not angulately recurved and recessed, and there is no evidence of evaporative areas.

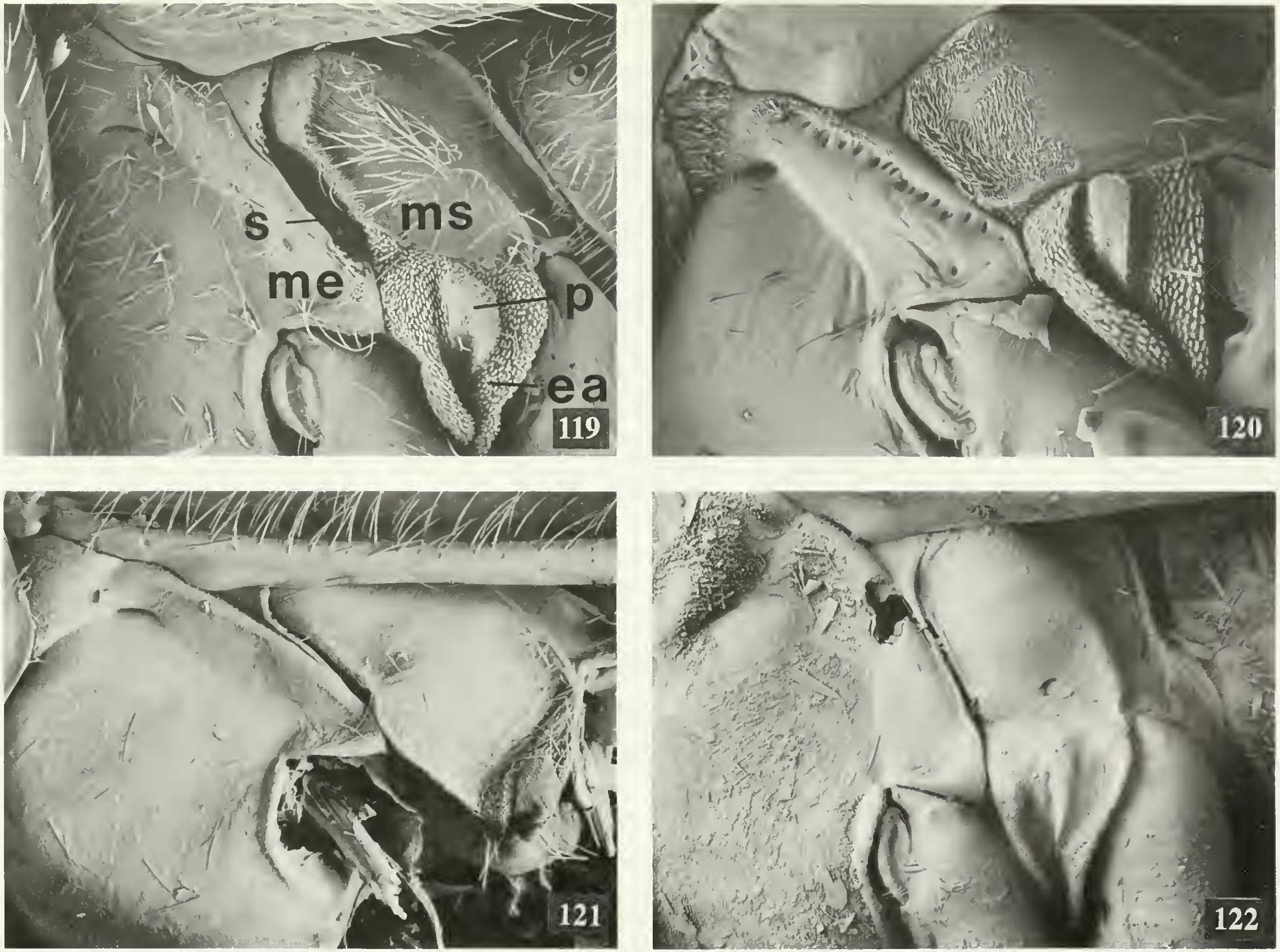
In *Bothynotus* (Fig. 119) (Clivinemini) evaporative bodies are present on the ventro-caudal angle of the mesepimeron, and there is evidence that the dorsocaudal arm is recurved and subsided. However, the pleura are clearly separated in *Bothynotus,* which is suggestive of a different character state to the Termatophylini, and similar to that found in *Conocephalocoris* and *Hesperophylum.*

The structure of the mesepimeron, and particularly the metathoracic spiracle is very similar to that found in the Dicyphini (Fig. 123), and somewhat similar to the Phylinae (Fig. 126) and Orthotylinae (Fig. 125). This form of the spiracular opening cannot be considered to be plesiomorphic for the Miridae, because of its absence in the plesiomorphic subfamilies Isometopinae (Fig. 128) and Cylapinae (Fig. 129), and is considered to be an important synapomorphy for the Termatophylini, and elsewhere in the Miridae. The striking similarity of the spiracular opening in the Termatophylini and Dicyphini is suggestive of a close relationship between these tribes. This has been previously suggested by Cobben (1968) whose examination of the termatophyline, *Termatophylidea opaca,* indicated similarities with the Dicyphini in the aero-micropylar structure of the eggs. More generally Wagner (1955) considered the Dicyphini as a sister taxon to the Deraeocorinae, primarily on the basis of the male genitalia. However, on the basis of the pretarsal structure (Schuh 1976), the Termatophylini are considered to belong to the Deraeocorinae, and the relationship of the Dicyphini to the Deraeocorinae requires examination, and is beyond the scope of this work.

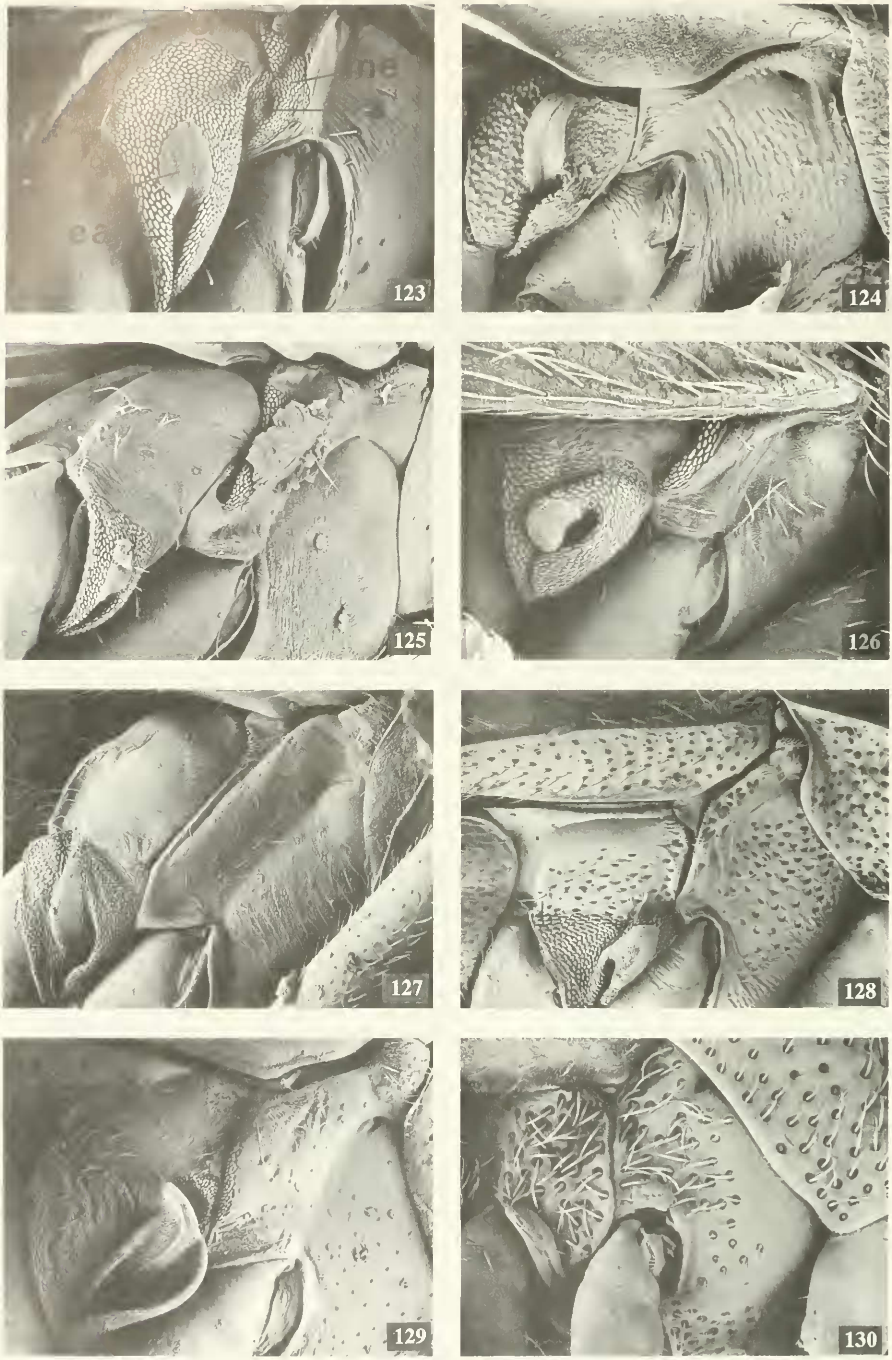
Node 6.—*Termatophylina* in this analysis is the most plesiomorphic of the termatophylines, on the basis of the small, flattened ommatidia. The remainder of the termatophylines form a clade of seven genera on the basis of the enlarged and convex ommatidia (7-1) and the presence of microsetae on the lateral margins of the gula (4-1). The presence of enlarged ommatidia has not been examined in other suprageneric group of Miridae and its importance requires further examination. The gula of termatophylines is usually weakly concave, with transverse ridges, and this clade is characterized by the occurrence of microsetae on the gula, which are absent in *Termatophylina.*

Node 5.—This clade is represented basally by the Western Hemisphere genera *Termatophyloides* and *Termatophylella,* and the four Old World genera *Kundakimuka, Democoris, Termatophylum* and *Arygrotelaenus.* It is defined by the following synapomorphies: the broad mesepimeron (20-1) and the peritreme posteriad to midwidth of the scent efferent system (23-2). The broad mesepimeron is correlated to the strongly angulate dorsal margin (Figs. 57, 60). In *Termatophylina* (Fig. 59) and *Termatophylidea* (Fig. 58) the dorsal margin of the mesepimeron is weakly arcuate, which is more typical for other Deraeocorinae, where the dorsal margin of the mesepimeron is almost linear to very weakly arcuate (Figs. 119–122). The angulate dorsal margin of the mesepimeron is rarely encountered in the Miridae, occurring in the Eccritotarsini (Fig. 130). This character state exists in other non-mirid cimicomorphans, such as the Anthocoridae (Fig. 124). The dorsal margin of the mesepimeron is fundamentally different in the Dicyphini (Fig. 123), Orthotylinae (Fig. 125) and Phylinae (Fig. 126), where the evaporative areas bridge to the postalare, producing a dissected dorsal margin.

The position of the scent efferent system peritreme in relation to the evaporative areas has some phylogenetic value in some of the mirid suprageneric groups. In the Isometopinae (Fig. 128) the peritreme is contiguous with the anterior margin of the metepisternum, and in the Eccritotarsini (Fig. 130) it is situated on the posterior margin of the metepisternum. This character shows variability within some mirid suprageneric groups, such as Termatophylini. In the most basal termatophyline, *Termatophylina,* the



Figs. 119–122. Pterothoracic pleura of non-termatophyline Deraeocorinae, lateral view. 119, *Bothynotus* sp. (Clivinemini). 120, *Hyaliodes* sp. (Hyaliodini). 121, *Trilaccus* sp. (Saturniomirini). 122, *Deraeocoris* sp. (Deraeocorini). ea = evaporative areas; me = mesepimeron; ms = metepisternum; p = peritreme; s = metathoracic spiracle.



Figs. 123–130. Pterothoracic pleura of Anthocoridae and non-deraeocorine Miridae. 123, *Dicyphus* sp. (Bryocorinae: Dicyphini). 124, *Temnostethus* sp. (Anthocoridae). 125, undetermined orthotyline species. 126, undetermined phyline species. 127, undetermined mirine species. 128, undetermined isometopine species. 129, *Cylapus* sp. (Cylapinae). 130, undetermined eccritotarsine species. ea = evaporative areas; me = mesepimeron; ms = metepisternum; p = peritreme; s = metathoracic spiracle.

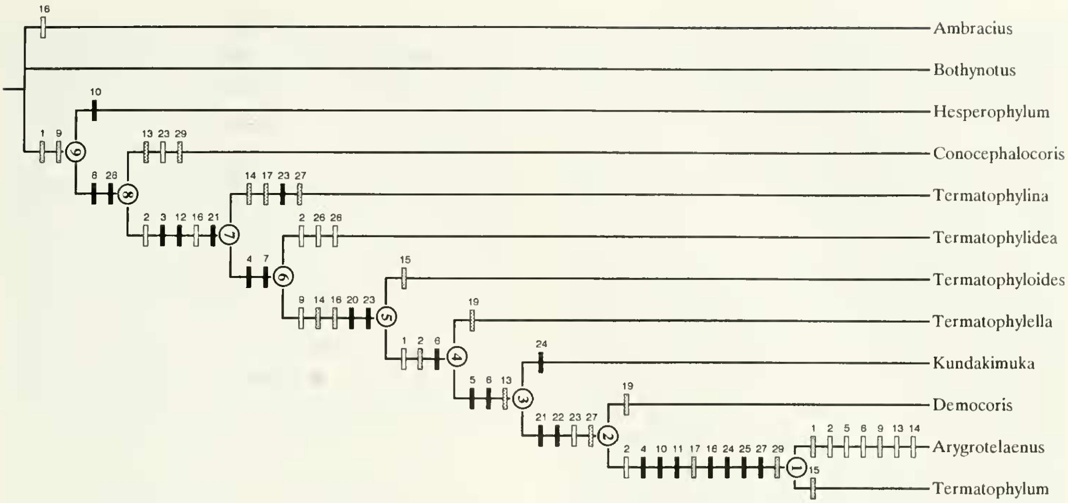


Fig. 131. Cladogram depicting phylogenetic relationships of the genera of Termatophylini. Black bars = synapomorphies; stippled bars = homoplasious forward; white bars = homoplasious reversal).

peritreme is contiguous with the posterior margin of the metepisternum (Figs. 59, 71). The peritreme caudad of the midwidth of the scent efferent system occurs in the three most basal genera of Node 5, and is reversed (23-1) for the clade of Node 2.

Node 4.—This clade of five genera (*Termatophylella* + *Kundakimuka* + *Democoris* + *Arygrotelaenus* + *Termatophylum*) is defined by the following synapomorphy: the eyes contiguous with the pronotal collar (6-1). This character is partly correlated to very large eye size, however, in *Termatophylella* the eyes (6–0) are not as large, but are still contiguous with the pronotal collar (Fig. 9).

Node 3.—This clade of four genera (*Kundakimuka* + *Democoris* + *Arygrotelaenus* + *Termatophylum*) is defined by the following synapomorphies: very large eyes (5-1) and densely distributed interocular setae (8-2). In this clade the genera have the eyes occupying almost the entire lateral aspect of the head, with the entire posterior margin contiguous with the collar in lateral view. The interocular setae are densely distributed in this clade, and are nearly always greatly elongate, greatly surpassing the maximum height of the ommatidia.

Node 2.—This clade of three genera (*Democoris* + *Arygrotelaenus* + *Termatophylum*) is defined by the following synapomorphies: the metathoracic spiracular opening recessed (21-2), and the scent efferent system not contiguous with the mesepimeric evaporative areas (22-1). In these genera the metathoracic spiracular opening is not visible when the pleura are observed in lateral view (Figs. 60, 68) and its presence is indicated by a short band of evaporative areas. In postero-lateral view, the spiracle is observed as a small, recessed opening, which is most obvious in *Democoris,* and is very small in *Termatophylum* and *Arygrotelaenus.* In many mirids the evaporative areas of the mesepimeron and metepisternum are contiguous. The scent efferent system, however, is often reduced, and in this clade, the separation of the two evaporative areas is considered phylogenetically significant.

Node 1.—The sister-group relationship of *Termatophylum* and *Arygrotelaenus* is strongly supported by the following synapomorphies: the gula with dense matt of microsetae (4-2), the male second antennal segment fusiform and swollen (10-2), the male second antennal segment with setiform and flattened scalelike setae (11-1), the parempodia broadly flattened and ribbonlike (24-2), the hemelytral membrane bicolored (18-1), the left margin of the male genital opening with a small tubercle (25-1), and the lobal sclerites sickle-shaped (27-2).

The vestiture of the gula of this clade is characterized by a dense matt of microsetae (Figs. 22, 23), occupying the entire region. This is somewhat variable in *Termatophylum,* but is found in the type species, *T. insigne.* The vestiture of the male second antennal segment of *Arygrotelaenus* and *Termatophylum* is composed of setiform, semierect setae, intermixed with flattened, scalelike setae (Fig. 30). This does not occur in any other termatophyline, and is possibly correlated with the presence of flattened, scalelike setae in *Arygrotelaenus* and some species of *Termatophylum.* The flattened, ribbonlike parempodia of *Arygrotelaenus* (Figs. 89, 95) and *Termatophylum* (Figs. 93, 94, 99, 100), represents the first reported variation of the deraeocorine setiform parempodial type, and strongly supports the sister-group relationship of these two genera. These parempodia retain longitudinal striations which also supports their derivation from a setiform type. Schuh (1976) has indicated that in the Miridae the lamellate type has been derived from the setiform type, and this case is evidence that this has occurred in the Miridae on more occasions than previously thought. This clade is supported by two make genitalic characters. The most significant of these is the presence of sickle-shaped lobal sclerites (Figs. 111, 116–118), whereas in all other termatophylines the lobal sclerites are linear, with the apex often tapered.

Discussion

I conclude that the Termatophylini belong to the Deraeocorinae, which are presently defined by the presence of basally cleft claws, and the presence of setiform parempodia. Schuh (1976) supported the monophyly of the Deraeocorinae on the basis of the pretarsal structure, and also indicated that most deraeocorines have a polished and punctate pronotum, and a tendency towards reduction in femoral trichobothrial numbers. The deraeocorine pretarsus, however, remains the only synapomorphy for the subfamily, and no additional support has been gained from my observations of the pterothoracic pleura. Despite the existence of some variation in the parempodia in the termatophylines, with *Arygrotelaenus* and *Termatophylum* having flattened parempodia, other characters do not strongly support an alternative taxonomic arrangement. The similarity of the Dicyphini and Termatophylini metathoracic spiracle is out-weighed by the great differences in their pretarsal structure. The male genitalia of the Termatophylini is consistent with those of other Deraeocorinae (Kelton 1959), although the secondary gonophore appears to be considerably reduced. The parameres are strongly asymmetrical, with the right paramere minute, which is again reminiscent of the Dicyphini, although this condition also occurs in other Deraeocorinae, such as the Hyaliodini and Clivinemini.

Schuh (1976), Akingbohungbe (1974, 1978), and Stonedahl and Cassis (1991) pointed to the inadequacies of the definitions of the deraeocorine tribes. Akingbohungbe (1974) made an analysis of various genera of Hyaliodini, and supported Knight (1943) in considering them as a subfamily, primarily on the presence of an anal tube. However, he recognized two groups within the hyaliodines, in which one group did not contain the anal tube, and no other character presented as a synapomorphy for the group. The glassy appearance of the hemelytra in many Hyaliodini strongly resembles the condition in the termatophyline *Termatophylidea,* which is superficially similar to *Hyaliodes,* although the heads are very different. The hemelytra of the hyaliodines and termatophylines are similar in structure, with the R+M and anal veins punctate in many of the genera of both tribes. This also occurs in other deraeocorines including *Conocephalocoris, Eurychilopterella* and *Hesperophylum,* and some Clivinemini. The expanded embolium is also shared by the former two tribes, although it is somewhat reduced in some termatophylines, such as *Arygrotelaenus, Termatophylum* and *Termatophylina.* It is clear that the glassy hemelytra and enlarged embolium are not sufficient characters for defining the Hyaliodini (Carvalho 1955b), and the tribe remains without a reasonable diagnosis.

The Clivinemini were defined by Carvalho (1952, 1955a) as having the "pronotum with an impressed line running from [the] antero-lateral corner to the posterior margin of [the] calli." This is also the case in the Termatophylini, with the line sometimes marked by a row of punctures. This groove demarcates the callosite region, which is generally much shorter in the Clivinemini than in the Termatophylini. There appears to be little character support for the definition of the Clivinemini as a suprageneric group. I have indicated that the mesepimeron and metepisternum are widely separated in the clivenemines, but this also occurs in some Deraeocorini, and thus does not define the tribe exclusively.

Carvalho (1952) erected the Saturniomirini as a deraeocorine tribe on the basis of characters of the pronotum, eyes, and hemelytral membrane. He indicated that the pronotum was constricted anteriorly, but this is variable within the tribe, as pointed out by Akingbohungbe (1978), and in my examination of a number of undescribed saturniomirines from Australia. Carvalho (1952, 1955a) also indicates that the calli are large and fused, which is mostly true within the tribe but also occurs in some Clivinemini and some Termatophylini. The one-celled membrane is variable within the Saturniomirini, and Akingbohungbe (1974) and Schuh (1976) have indicated that this character has little taxonomic value in the Miridae. Curiously, the one-celled membrane is invariant in the Termatophylini. Carvalho (1952) reported that the eyes of saturniomirines are semistylate, which appears to be consistent in all members of the tribe examined. At present it is difficult to evaluate this character because not enough material within the remainder of the subfamily was available for examination.

Carvalho (1952, 1955a) defined the Deraeocorinae chiefly on the basis of absent characters. His key couplet read as follows: "pronotum not constricted anteriorly; calli not prominent and fused; neither are eyes semistylate; membrane usually with two cells." It is obvious that this definition does not provide any diagnosis or synapomorphy for the nominate tribe of the Deraeocorinae. Stonedahl and Cassis (1991) suggested that the tribe was paraphyletic, and was basically a taxon that contains the genera that could not be placed within the more narrowly defined tribes. They established the sister-group relationship of the Deraeocorinae genera *Angerianus* and *Fingulus,* and suggested that a broad survey of the male genitalia would possibly enlighten the situation. I did not have any material of Surinamellini, and cannot comment on the definition of this tribe.

It is evident that aside from the present definition of the Termatophylini, no other deraeocorine tribe can be established as a monophyletic group. Undoubtedly, suprageneric groups occur within the other deraeocorines, such as the anal tube bearing Hyaliodini, but a thorough analysis of the genera is required to provide a useful classification.

The similarity of a few Termatophylini, such as *Kundakimuka* and *Termatophylum,* with some Anthocoridae is undoubtedly due to convergence. The most striking similarities include the abbreviated first labial segment, the short antennae, with the third and fourth segments greatly reduced, and the presence of large, forward projecting setae, on the antero-lateral corners of the pronotum. However, termatophylines possess femoral trichobothria, a mirid-type pretarsus, the hemelytral membrane with a closed cell, and typical mirid male genitalia. There is also no evidence that any of the termatophylines have copulatory organs associated with traumatic insemination, typical of most Cimicoidea. The similarities that do exist between the termatophylines and anthocorids have obviously evolved independently, and there is no reason to remove the Termatophylini from the Deraeocorinae.

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